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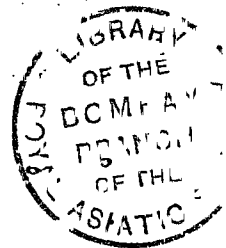
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CROP EXPERIMENTS, 133394
BOMBAY PRESIDENCY,

1894-95. 5 1900-01



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FROM

E. C. OZANNE, ESQUIRE, I. C. S., M.R.A.C.,
Survey Commissioner, and Director,
Land Records and Agriculture,
Bombay;

To

J. MONTEATH, ESQUIRE, I. C. S.,
Acting Chief Secretary to Government,
Revenue Department, Bombay.

Poona, 9th December 1895.

SIR,

I have the honour to forward the Analysis of Crop Experiments, made in 1894-95, at a date still later than that on which the report was ready last year. Mr. Mollison has done all in his power to complete the Analysis early enough to ensure the receipt of the compilation by officers at the opening of the fair season, but has not succeeded.

2. The table given below exhibits the extent of work done :—

Division.	1892-93.		1893-94.		1894-95.	
	Report- ed.	Reject- ed.	Report- ed.	Reject- ed.	Report- ed.	Reject- ed.
Northern Division	54	...	44	1	37	3
Central Division	35	5	45	20	56	12
Southern Division	32	2	45	2	41	3
Total	121	7	134	23	134	18

Of the gross number of experiments made, 21 were performed by Survey officers, 4 by Superintendents, Land Records and Agriculture, and 3 by the Superintendent of Farms. There is again no report from the Superintendent, Land Records and Agriculture, S. D., who alleges severe pressure of settlement duties. It is expedient that Mr. Lushington should not again fail in this duty, which is one peculiarly important, I think, for officers in his position who more than officers of the regular Revenue line should improve their knowledge of agriculture.

3. In preparation for the quinquennial return of yield statistics all experiments are "ordinary", i. e., no attempt is made to study the general profits of agriculture by including in the scope of an experiment all the crops of an individual holding.

4. For some years, chiefly with reference again to the quinquennial return, an effort has been made to indicate the crops on which tests should be made in each district.

A statement is appended, which shows what crops were actually tested, and which of them will find entry in the quinquennial return, the latter being marked with an asterisk :—

Division.	*Jowari.	*Bajri.	*Rice.	*Wheat.	*Harik.	*Nagil.	*Navari.	*Vari & Barag.	*Gram.	*Val.	*Lang.	*Onions.	*Sugarcane.	*Sesamum.	*Linseed.	*Rapeseed.	*Nigerseed.	*Groundnut.	*Cotton.	*Grass.	Total.
Northern Division...	1	2	1	3	..	5	..	..	11	1	1	..	2	1	..	1	..	..	1	7	37
Central Division ..	2	13	6	11	..	4	..	..	10	..	..	3	1	4	2	..	..	1	..	..	56
Southern Division ..	8	4	10	1	1	6	1	2	6	1	..	..	..	..	..	2	..	..	..	..	41
Total ..	11	18	17	15	1	15	1	2	26	2	1	3	3	5	2	1	2	1	1	7	134

NORTHERN DIVISION.

5. There is still a falling off in the total number of experiments made in this Division in spite of a considerable contribution by Survey officers. From Surat only one report has been received for reasons partly shown by Mr. Mollison. The orders of Government in the Resolution on the last report naturally could not affect the season of which the work is now under review, but there are at present two officers, practically on special duty, and their work is being supplemented by special attention by Survey officers, and by the Superintendent of Farms. The results will be included in next year's review, unless it is found advisable to make a special report in view of the question of Surat revision settlements.

6. In the Gujarát districts the season was unfavourable, especially for *bājri*, cotton and sesamum, on which tests are reported. Experimenters found much difficulty in finding suitable subjects for experiment, and a rather unusual number of tests were taken on late crops following kharif crops of the same year.

These were useful in showing how far the *rayat* can recoup himself for the partial failure of the main crop. Some tests were taken on crops sown too late for good results. Taking season into consideration none of the experiments indicate over-assessment, or even uneven rental in *revised* areas.

7. In Thána, where conditions are very diverse from those of other districts in this Division, there is evidence also of the success with which second crops make up largely for an unfavourable early crop. In this district the early rice was much damaged, but even here second crops did very well, though distinctly unusual; for as a rule land, on which the early poor kinds of rice are grown, retains no moisture for a later crop.

8. Mr. Hudson's grass tests are valuable and bear out the correctness of the action taken at revision settlement in this and the Kolába Collectorate in raising the rental where grass finds an easy market. Mr. Mollison gives in extenso the receipts at grass auctions, but does not comment on the apparent anomalies thereby shown. It may be added, therefore, that where the sale-proceeds are low, as compared with the assessment, the land is either too far from the rail, or is a poor grass producer on account of the presence of tree growth. These tracts are under revision and in them one of the faults of original settlement will be corrected by which in *varkas* and *rabi* the maximum rate did not vary with market facilities. The table and the actual tests taken also show that where these facilities are great, much *kharif* or rice land is found to pay better for grass than for tillage. Much of the area shown in the tables is probably unoccupied waste.

9. Messrs. Cadell and Phirozsháh are complimented on the care with which their reports have been made, but in the Division the general standard of excellence this year is certainly not high. Mr. Mollison has rejected three tests reported for adequate reasons. It is a question whether all Mr. Kábráji's experiments should not have been summarily rejected for his neglect to cut the crop of the minimum area fixed. The same treatment might well have been accorded to Mr. Pránál. Mr. Mollison has shown some reasons for doubting his accuracy. There is another, that the yield in two of three tests should have been found at precisely the same figure. The officers in Broach succeeded in carrying out the fixed programme in its entirety.

CENTRAL DIVISION.

10. In the total of reported experiments there is a satisfactory increase. The number of rejected reports, though not so large as last year, is still too large. In each case the reason for rejection is recorded and seems sufficient. Indeed, as in the Northern Division so in the Central, some reports have been admitted which hardly deserved acceptance.

11. In the following table both classes are included :—

Name of officer.*	District.	EXPERIMENTS.	
		Rejected.	Untrustworthy.
Mr. Sitáram Dámodar	Khándesh ...	2	...
„ C. M. Thatte.	Násik ...	1	...
„ G. H. Hampton	Do. ...	3	1
„ S. Padamji	Ahmadnagar ...	3	...
„ V. B. Vádekar	Do. ...	0	3
„ A. Westropp	Poona ...	1	...
„ R. C. Brown	Sholápur ...	1	...
„ B. Kennedy	Do. ...	1	...

The untrustworthy experiments were those taken on areas below the fixed minimum. The minimum is low enough.

12. In Ahmadnagar and Sholápur the number of tests taken was very low. In Poona the programme was fully carried out.

13. A considerable number of experiments were made on *pátasthal* land in Khándesh and Násik, where the question of the manner in which the charge for water of running streams should be made in future will soon come up at revision survey. In one of these tests (No. 44) the incidence is high, but that could not have been otherwise, when it is seen that the occupant tried to get a crop of wheat without manure, under a bad rotation, in land usually irrigated.

In another (No. 57) the incidence is very high, even though calculated only on the value of the second crop. The land is invariably double-cropped, and the assessment is not proved excessive by the failure, not fully explained, of a meagrely watered late crop of gram. In the same district a very similarly circumstanced gram crop succeeded remarkably well (Exp. No. 60), though the water charge was much lower.

Test Nos. 62, 65 and 66 were on the rice crop in a rotation, which includes sugarcane once in four years, on land irrigated by *pát*. In these the results were very good, though the occupant in test No. 65 lost by growing *kamod* rice from broadcast sowing.

14. In Sátára one test on *pátasthal* land (No. 88) is reported. The average assessment should have been shown in column 10 of the summary as Rs. 8-3-9, and the incidence in column 11 as 26-60. The conditions are somewhat anomalous. On the Khánápur settlement, orders were passed fixing a limitation to the increase of the total *pátasthal* assessment over that recorded at original settlement. In the Khánápur and Koregaon tálukas an adjustment was necessary. The proposed assessment had gone beyond the limit, and under the alternative methods sanctioned by Government for reducing the total to the limit, in some cases, as in the case of the land of Experiment No. 88, the area to be assessed was fictitiously reduced. The whole area is nevertheless *pátasthal*, with all the rights of *pátasthal*, and the amount of the water cess must be considered as the water charge for the whole of the area, classed as *pátasthal*.

In no other case does any comment seem called for as regards incidence of assessment.

15. Mr. Mollison's remark (Exp. No. 74) as to the "moderate rainfall" of the Mával táluka of Poona is hardly correct.

His onion tests, taken to give himself the best information as to the success of the substitution of onions for potatoes, where the "ring" disease is prevalent, are valuable. The high farming shown by the detail of cost of cultivation, the correctness of the rotation and the skill in utilization of *pát* water are worthy of special notice.

16. In this Division Messrs. Du Boulay, Seddon, Ichhárám and Cursetji performed specially careful experiments.

SOUTHERN DIVISION.

17. The number of tests made is slightly below last year in spite of a considerable contribution from Survey officers in Kolába. Three were rejected, but only one of these for non-observance of standing orders. The other rejections were due to the inutility of testing a small row crop only in a mixture. There are other experiments which Mr. Mollison has admitted, because they have an interest, which strictly should have been rejected. It is no excuse to say that the mistake in taking too small an area was due to having no copy of standing orders, first because no experimenter should take experiments without this guide before him, and because also the report form also contains the rule as to the minimum area of test.

18. In the Southern Marátha districts the smallness of the incidence of assessment throughout is very remarkable. Nos. 96, 97 and 111 are perhaps exceptions. No. 96 appears to be one of those wonderful fields which without manure grow continuous *jowári*. They are often talked of, and it is interesting to find proof that they do exist. In this year the success of the crop was not great, but the yield figures, if they were available, would be interesting to contrast for a long period of years with the Rothamsted continuous wheat experiments. The crop of No. 97 suffered from cloudy weather, but the incidence is not excessive. That in No. 111 was a fallow crop and unfortunate even as such.

19. The extraordinary range of yield in *jowári* is well brought out. The range is from 126 lbs. (No. 96) to 1,486 lbs. (No. 99) in adjoining talukas. These are both yields of good land, not very differently assessed. In the latter the high yield is due chiefly to good rotation and manuring. In the former the occupant, as has been shown, trusts to the natural fertility of his land. The net profit in the two fields no doubt was less diverse.

In light lands the yields were in most cases very satisfactory, *e. g.*, Nos. 94 and 95.

20. In the Konkan districts the results of the special trials in Devgad have already been reported, but Mr. Mollison has placed them on the record for publication. They give no support to the allegation of over-assessment in that taluka. The Survey officers have done useful work in the Kolába talukas yet for revision. In them the assessment is not low, though a very fair profit is disclosed. The contrast between Nos. 123 and 124 exhibits clearly the fact, well known, but better thus clearly shown, that in the rábed seed-bed the yield is much higher than in the unmanured field transplanted with rábed seedlings.

21. The tests on hot-weather rice, following a rain crop, Nos. 133 and 134, do not show results to be compared with similar tests previously published. In these as in the case of other second crops, *e. g.*, Nos. 115 and 116, the incidence takes no account of the chief crop of the season, but the second crops paid very well generally.

22. In this Division the work done by Messrs. Kelkar, Deshpánde and McNeill was good and careful.

I have the honour to be,

Sir,

Your most obedient Servant,

E. C. OZANNE,

Survey Commissioner, and
Director, Land Records and Agriculture.

ANALYSIS OF CROP EXPERIMENTS.

NORTHERN DIVISION.

Ahmadabad.

The programme settled for this district embraced tests on wheat, *jwār*, *bāri*, gram and sugarcane. Six tests only on gram have been reported. Mr. Robertson, Assistant Collector, conducted no experiments owing to his absence with a survey party.

Mr. J. K. N. Kābrāji, Assistant Collector,

Submits three crop tests on gram. The selected crops were in each case uneven. Count was taken of this in selecting the test areas, but the area of crop experimented upon in each field was below the prescribed dry-crop minimum. The reasons assigned are not satisfactory. As the crops were uneven, there was the greater necessity to strictly follow the standing orders.

The first test (No. 1) was taken on new rice land. The soil is *gordū* and the field is embanked. It bears an assessment of Rs. 4-10-8 per acre, and grows rice every year followed by gram as a second crop in years of favourable late rainfall. The second crop is not often taken. This year the rice, which was manured with about 17 cart-loads ordinary manure per acre, was a poor crop. Gram occupied the whole number, but part of the field was sown late, and the crop on this portion was not ripe at date of experiment and was not so promising as the portion experimented upon. When the rice was harvested, that portion of the field tested was ploughed and again cross-ploughed. The seed was broadcasted at the second ploughing by hand in the furrow behind the plough and covered by the next furrow. The reported seed-rate, 55 lbs. per acre, is probably about average for this method of sowing, though more than the formulæ. The crop was sown in November, but did not ripen until the 7th April, an indication that the soil held enough moisture.

The crop was tested on two separate areas, but the outturns did not materially differ. The average of both works out 1,287 lbs. pulse per acre, which at a cheap rate is worth Rs. 23-8-6. The experimenter does not value the by-product. He says the leaves and the husks of the legumes are fed to cattle, but never sold. The crop is assessed at the maximum anna valuation. The incidence of assessment, 19·83 per cent, is not high for a second crop, but it may not fairly represent the burden of assessment on the whole number, because half the field grew a crop admittedly inferior to the crop tested.

This officer's second and third tests (Nos. 2 and 3) were taken on gram crops, which were each second crops after rice. The fields were close together; the tests were taken on the same day. The crops were selected as average of the village, yet the yield of one field is much higher than that of the other. The higher assessed field yielded the poorest crop. Apparently the experimenter selected the fields to afford "some striking considerations as to the inequality of the assessment." It is impossible to judge, from the information reported, whether the fields tested are unequally assessed or not. If the experimenter wished to prove that they were, he ought to have made a much fuller enquiry than he did. The higher assessed field was not cropped in the previous year, "owing to want of a cultivator." The lower assessed field for six years previous to the present season grew no second crop. In respect of the higher assessed field no information is given as to the frequency of second crops in previous years. The experimenter remarks that this year the rainfall for this crop was "perhaps excessive than otherwise" which I take to mean that this field either by position or otherwise is more retentive of moisture than the other field, the crop of which was apparently not affected by the same cause. If, taking one season with another, one rice field retains more moisture for a

second crop than another rice field, I can understand that the former should bear the higher assessment, even though in occasional years excess of moisture may do harm.

Two test areas were selected in the higher assessed field ; three in the other. The outturn results from each test area show that the crop over each field was very irregular. The lower assessed field was large (9 acres 4 gunthas). The test areas were, respectively, 2 gunthas, 2 gunthas and 1 guntha, or in the aggregate $\frac{5}{3}$ of the prescribed minimum. They, respectively, yielded at the rate of 1,315, 955 and 395 weight *seers* (40 *tolas* each) of pulse per acre. The higher assessed field was smaller (3 acres 1 guntha) and 2 test areas of 2 gunthas each, $\frac{1}{2}$ the prescribed minimum, were selected. The outturns from each were, respectively, 705 and 500 weight *seers* per acre. I doubt very much whether in either field the gross outturn could be approximately gauged by the results from such small test areas even if these were selected by an experienced farmer, and it is certainly unsafe to judge of the relative assessments of the fields from tests on the second crops only.

I tabulate results from each field as under :—

	Anna Estimate.	Outturn of Pulse per Acre.	Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
	As.	Lbs.	Rs. a. p.	Rs. a. p.	
First field (Exp. No. 2) ...	14	1,012	20 9 0	3 15 4	19.25
Second do. (Exp. No. 3) ...	11	618	12 0 19	5 9 11	46.64

The kharif crops in each field are assisted by canal irrigation, Rs. 7 per acre being the water-rate. Neither field was manured for the rice or the gram. Each field was well ploughed for the second crop. The crops were sown about the same time and were ready for harvest on the same day. The outturn on the lower assessed field is unusually high, and might be fairly estimated at the maximum standard. The market rate at which the principal product is valued is in each case unusually low.

Mr. Jethálál Varajbhái, District Deputy Collector;

Sends three crop tests (Nos. 4—6) on gram. The fields selected for experiment have each black soil and ordinarily grow cotton and *juvár*. *Juvár* had been sown in each field, but the crops partially failed through excessive rainfall. The experimenter gives few details except his tabulated figures. The season was favourable. The cultivation is described as good in the first and third tests, indifferent in the second. The seed-rate is reported the same for each field, and I think under-estimated at 20½ lbs. per acre. The crops were sown seasonably in October and ripened about the 20th of February. The burden of assessment can scarcely be judged of from the results, which are in the first and third tests as good as could reasonably be expected from land which usually does not grow second crops. The principal product is in each case valued at the cheap rate of 41 lbs. per rupee.

I tabulate results below :—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		Principal Product.	By-product.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
First field (Exp. No. 4) ...	12	506	230	13 9 6	3 11 4	27.28
Second do. (Exp. No. 5) ...	12	260	76	6 13 7	4 8 2	65.85
Third do. (Exp. No. 6) ...	12	439	124	11 7 2	4 3 6	36.85

Kaira.

Four experiments on *bajri* and two on wheat have been reported from this district. Of these, two tests on *bajri* have been omitted for reasons given further down.

Mr. E. H. E. Leggatt, Assistant Collector,

Submits an experiment on *bajri* taken on garden land assessed at Rs. 12-12-5 per acre. This experiment I must reject. This crop was spoiled by heavy rain and the outturn is estimated at 6 annas only. *Bajri* cannot be called a representative crop of garden land. It is grown on such land generally with the object of resting the soil for a season from irrigation and to provide fodder for the large number of work cattle necessary for well irrigation. The results from a *bajri* crop grown on garden land can form no guide as to the burden of assessment even in the most favourable year. The experiment was begun by Mr. Lord. He proceeded on leave. The crop when dry was threshed and weighed by Mr. Modi and the report has been tabulated by Mr. Leggatt from notes left by his two predecessors. This is an unsatisfactory way of submitting a crop experiment report.

This officer submits two tests (Nos. 7 and 8) on wheat. One taken on embanked land, the other on ordinary *jirayat*. The former gave much the best results, the reason being that the crop of this field was very much better looked after and the cultivation of very much better character than that in the other. In each case wheat was a second crop after rice and the fields are generally double cropped with the same crops every year. In 1894-95 the rice of the first field was fairly manured, that in the other field was only lightly manured. No manure was given for the second crop. This system of cropping is distinctly exhaustive and shows no appreciation of the value of good rotation.

The crops were each sown in October, the seed being sown by hand, through a seed tube fixed behind the plough at the last ploughing. This method of sowing, unless the soil is very smooth, requires a large seed-rate, and that reported in the first test, 77 lbs. per acre, is probably much nearer the mark than that reported for the second, 24 lbs. per acre. The incidence of assessment is in each case light for second crops.

The results are as under :—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		Principal Product.	By-product.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
First field (Exp. No. 7).	12	642	538	24 1 0	2 7 3	10.19
Second do. (Exp. No. 8)	8	241	308	9 11 0	1 10 5	17.04

Mr. B. E. Modi, District Deputy Collector,

Sends three tests on *bajri*. In each case subordinate pulses grew with the cereal. The pulses were not tested, but the experimenter's estimates indicate that their yield was poor. The probable outturn of subordinate crops cannot, however, be approximately estimated by a cursory inspection. The season was unfavourable for *bajri* throughout Gujarát. The crops tested were damaged by heavy rain falling during the flowering period. *Bajri* is peculiarly susceptible of injury at this critical time. I think the anna estimates are pitched far too high and particularly so in the second test where the incidence of assessment works out 72.61 per cent. The field is small, 34 gunthas. The assessment exigible from the field is Rs. 4. The registered owner has rented it to a Koli who

pays for the field Rs. 10-8. Mr. Modi thinks this a high rent and that the Koli is able to pay it because there are mango and other trees which the Koli tenant has grown. If the tenant's income is chiefly from the trees the field should not have been selected for experiment; because if the trees are so numerous as to be the chief source of income the cultivated area must be unfavourably affected by their shade and otherwise. There are hedgerow trees round almost every number in *goradu* soil in the Kaira district. A wide headland of grass is left under the trees and the cultivated crops are not therefore damaged to any appreciable extent, and a border of grass is not itself unprofitable. The *bajri* outturn is valued at approximately $\frac{2}{3}$ of the rent paid by the Koli. It is certain that the results are much under average and therefore no guide as to the burden of assessment. For this reason I cannot report the experiment.

As regards the other experiments the incidence of assessment works out no higher than might reasonably be expected in an year which was admittedly unfavourable.

In the first field (Exp. No. 9) *bajri* had subordinate crops of *mug*, *math* and *juvar*. The soil is *goradu* and grows *bajri*, *kodra* and *bavto* in consecutive years, the two former with subordinate mixtures; the latter as usual alone. The *bajri* was not manured this year, but a liberal application was given in each of the two previous years. The *bajri* would apparently have given a good yield of grain, if it had not been damaged by heavy rain. I judge of this by the weight of straw. The by-product is valued at a high rate, viz. 192 lbs. per rupee or Rs. 10 per acre.

The crop of the third test (No. 10) was manured with 16 carts of farmyard manure per acre. Excessive rain spoiled this crop also, yet the experimenter estimates the outturn at the average standard. The field grew *bavto* in each of the three preceding years. The cultivation of the *bajri* is described as very good. The crop was twice sown, the first seedlings being eaten up by caterpillars. The second sowing was late in July and therefore decidedly unseasonable for Gujarát. The *bajri* had a subordinate sprinkling of *juvar*, which did not succeed. It is reported that the field has occasionally been irrigated for cold weather crops; that the water was found brackish and that the soil was somewhat injured thereby.

I tabulate the results from each field as under :—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.	Remarks.
		Principal Product.	By-product.				
		Lbs.	Lbs.				
First field (Exp. No. 9)	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.		
...	14	364	1,923	21 1 6	3 14 1	18.39	By-product valued at Rs. 10 per acre
Third do. (Exp. No. 10)	16	585	1,395	23 7 0	4 8 3	19.26	By-product valued at Rs. 5-10-0 per acre.

Panch Maha'ls.

Mr. Heblikar was directed to conduct 3 tests on rapeseed and 2 on gram, Mr. Pránál 3 each on *bavto* and sugarcane. The former conducted only 1 test on rapeseed and 2 on gram, exigencies of four and *jamabandi* work having prevented him from doing further work. The latter carried out only the *bavto* tests.

Mr. B. R. Heblikar, District Deputy Collector,

Reports two tests on gram and a third on rapeseed. Each was a second crop after maize. In the three fields selected for experiment the kharif crop is generally maize, and second crops are taken annually. The second crops are either gram, wheat or rapeseed, the first named being most commonly grown. Maize and gram in the same year is not a bad combination, but wheat or rapeseed taken after maize must be considered an exhaustive system of cropping.

Those lands in the Panch Maháls which have in recent times been brought under cultivation may stand the strain temporarily or even for some time, but sooner or later exhaustion will be made manifest if the cultivators do not show some appreciation of the value of good rotation. The experiments go to prove that the burden of assessment for the time being is extremely light.

Rapeseed (Exp. No. 11) was the subject of the first test. The previous maize crop was manured with 10 loads of ordinary manure per acre, but none was applied directly for the rapeseed. The soil is *gorádu* assessed at Rs. 2 per acre. The season was favourable, the cultivation indifferent. Thirteen pounds of seed per acre drilled in November through a single seed tube fixed behind a plough produced a 12-anna crop which ripened early in March and yielded 359 lbs. seed per acre. The principal product is valued at Rs. 17-8-0 per acre. The percentage incidence of assessment is 11.22 and this for a 12-anna second crop indicates that the burden of assessment is very light.

The gram tests (Nos. 12 and 13) may be conveniently contrasted. The previous maize crops were each manured, in one field with 16 cart-loads of ordinary manure per acre; in the other with 6 carts. The gram was not directly manured in either field, but the pulse after the more liberally manured maize yielded best. Each field has *gorádu* soil; one field is assessed at Re. 1-13-9 per acre, the other at Re. 1-4-9. Season and tillage are described in each case as good. There is a slight difference in seed-rate but both are about average. Each crop was sown seasonably in November and ripened in the third week of March.

The results are as under:—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.	Remarks.
		Principal Product.	By-product.				
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.		
First field (Exp. No. 12.)	16	1,313	1,313	22 10 8	1 13 9	8.20	Previous crop liberally manured.
Second field (Exp. No. 13.)	12	846	615	14 6 0	1 4 9	9.02	Previous crop sparingly manured.

Mr. Pránál Harkisandás, District Deputy Collector.

This officer sends three *bávto* tests. All three were taken on the same day. Two of the fields selected were in one village, the third in another. It is possible, but not probable, that the three numbers were close together. The test areas in the aggregate measured 33 gunthas. Four patches of 2 gunthas each were cut in the first field. The whole crop was cut in the second field, the area being small. In the third field 5 patches of 2 gunthas each were cut. I question whether an experimenter could accomplish this in one day and give the close personal supervision required by standing orders. For this reason I do not attach much value to the experiments.

In the first and third fields (Exp. Nos. 14 and 16) *bávto* had *math* subordinate to it. The experimenter attempts to apportion the areas respectively under the cereal and pulse, but as the *bávto* was grown from transplanted seedlings which were first grown in a seed-bed and the *math* was broadcasted, I do not see how the respective areas can be apportioned. The subordinate pulse was not tested in either field and the acre averages of the *bávto* are calculated on the supposition that it alone occupied the whole area. Of course the incidence of assessment as deduced from this data appears higher than it actually is. Experiments of this class are, therefore, worthless for gauging the burden of assessment.

This officer's second test (No. 15) was taken on red brown land assessed at Re. 1-10-8 per acre. *Bávto* is grown every year, the reason probably being that the field is suitable for *bávto* by position. The crop was transplanted but neither

seed-bed nor field was manured. Under the circumstances the outturn was as good as the cultivator could reasonably have expected. A $5\frac{1}{2}$ -guntha seed-bed sown with approximately 11 lbs. seed provided seedlings for an acre of transplantation. The seed-rate is high. Late rains damaged the crop to some extent.

The results are as under :—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		Principal Product.	By-product.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
Experiment No. 14 ...	12	651	2,906	15 3 0	1 11 10	11.45
Do. No. 15 ...	12	651	2,651	15 1 2	1 10 8	11.06
Do. No. 16 ...	10	691	2,640	15 14 6	0 11 7	4.56

Broach.

The programme for this district was fully carried out, one experiment each on rice, sesamum, *láng*, *juvár*, cotton and wheat has been reported.

Mr. Phirozshah Pestanji, District Deputy Collector,

Submits one rice test. The report is carefully and intelligently compiled and details of considerable value are given.

In the Broach district the season is reported to have been disastrously unfavourable for staple dry-crops, owing to excessive unseasonable rain. On the other hand, it was exceptionally favourable for rice. Two principal varieties of rice are grown in this officer's charge—one fine, the other coarse. The coarse variety, known locally as *Jadu saliu* was selected for experiment. The cultivation of this variety is in favour with the poorer cultivators because in an average season it need be irrigated only two or three times, whereas the finer rice wants water twice as often. Weeding too need not be so carefully or so often done as with finer varieties, and the latter take a month longer to ripen.

The field selected is rent-free service Inám land. It is rented by a Bohora from the village Bhangi for a term of five years at approximately Rs. 16-10 per acre, the Government assessment being Rs. 10. The Bohora occupies other land and is well-to-do. The field is under the village tank. It grows rice every year, but apparently no second crop. The crop was grown from transplanted seedlings. The seed-bed was well manured, but no manure was applied to the field. A $3\frac{1}{2}$ -guntha seed-bed is reported to have supplied seedlings for an acre of transplantation. I cannot accept the estimated seed-rate, 100 lbs. per acre, as accurate. It is much too high. The cultivation is described as indifferent, weeding being neglected and the banks for impounding the water had been in part washed away. The occupant explained that *Jadu saliu* was hardy enough to thrive in spite of these disadvantages. Ordinarily the crop would have been watered twice or thrice from the tank; this year the rainfall was unusually heavy and only one watering at the beginning of October was necessary. The reported weight of straw is less than that of grain. This is unusual. The experimenter notes the fact, and says he is quite sure of his figures.

The outturn, &c., results are as under :—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		Principal Product.	By-product.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
Experiment No. 17 ...	18	2,769	1,900	52 8 5	10 0 0	19.03

I think it is pretty clear that the profit which accrued to the cultivator was quite satisfactory after paying rent and meeting all expenses. The cost of tillage was certainly lighter considerably than usual, because no manure was applied and weeding was neglected.

Mr. W. S. Dracup, District Deputy Collector,

Submits one test each on *láng*, *rabi juvár* and wheat. These are the principal dry-crops excepting cotton of the black soil of Broach. The season for wheat is described as fair. For *juvár* and *láng* it was decidedly unfavourable. The heavy October rains left the fields in such a swampy condition that sowing of these two latter crops was unseasonably delayed. Both *láng* and *juvár* in Broach are sown usually before the commencement of the usual *rabi* season. *Láng* was damaged by cloudy weather in January, caterpillars appearing at the same time. Apparently the *láng* field selected was much above average, because the experimenter reports it was one of the few *láng* crops that yielded any grain produce at all. It was damaged by caterpillars but not to the same extent as *láng* in other fields.

In the tested field (Exp. No. 18) cotton is grown in alternate years with either *juvár*, *láng* or wheat. The soil is deep black and bears an assessment of Rs. 5-3-8 per acre. Forty-one pounds of seed drilled in November (usual season of sowing is September) produced an 11-anna crop which ripened in the middle of February. No manure was applied this year. The outturn, 768 lbs. of pulse per acre with the by-product, is valued at Rs. 22-3-5. The by-product is, however, valued at an exceedingly high rate, about 106 lbs. per rupee or approximately at Rs. 10 per acre. The incidence works out 23.54 per cent and would be considerably higher if the by-product was valued at a fair rate. Cotton will, however, in an average year bear the greater portion of the Government assessment if the field is not wet by position. There are a good many low-lying wet fields in Broach, and although cotton is occasionally successfully grown on such land, *láng* must be considered the principal and the rent-paying crop.

The *juvár* crop (Exp. No. 19) was sown in October, a month later than usual. The field was lightly manured. Cotton and *juvár* are generally grown in alternate years; occasionally *láng* and wheat are taken. The assessment is Rs. 4-10-6 per acre. The seed-rate, about 9 lbs. per acre, is nearly average. Tillage is described as good. The outturn, 468 lbs. of grain and 1,570 lbs. of by-product, is according to local opinion held to be a 14-anna crop. This valuation is probably much too high. Otherwise the burden of assessment is very heavy. The percentage incidence works out 27.76.

The wheat results (Exp. No. 20) are more satisfactory. Probably the season would have been more accurately described as good than as fair. The seed, 43 lbs. per acre, was seasonably drilled in November. The heavy late rains must have left the soil full of moisture; and, no doubt, the wheat benefited thereby. The assessment of the field, Rs. 3-11-4 per acre, is less than in the two other fields. No manure was applied. The cultivation otherwise was good. The soil is deep black and grows cotton in alternate years with either wheat or *juvár*. The outturn of 742 lbs. of grain and 790 lbs. of straw is valued at Rs. 24-13-6 per acre, and is, I think, over-estimated as a 19-anna crop. The incidence of assessment, 14.95 per cent, is moderate for Broach.

Mr. Sorábsháh Hormasji, District Deputy Collector,

Conducted two ordinary experiments, one on cotton, the other on sesamum. The season for both crops was unfavourable throughout the Broach district. The sowing of cotton was unseasonably delayed owing to heavy early rains. Late sown cotton rarely succeeds. The crop was considerably damaged by rain in November and by excessive cold during three consecutive nights in January. Many of the immature bolls fell to the ground owing to the effect of cold. Sesamum requires no more moisture than a deep moisture-holding soil retains from favourable September-October rains. The crop is certain to be damaged if very heavy rain falls after it is sown. The October-November rainfall had apparently this effect throughout Broach.

The results of this officer's cotton experiment (No. 21) exemplify the difficulties met with in accurately testing this crop. Four pickings were made at intervals between the middle of March and the 1st of May. No district officer, except under exceptional circumstances, could spare the time to personally supervise each picking, and he would further find considerable difficulty in having the field watched between pickings to prevent pilfering or surreptitious picking.

Mr. Sorábsháh supervised the first picking which was the most important one. The other pickings were attended to by the Mámlatdár.

A portion of the first picking was hand-ginned to determine the percentage of lint which was found to be 28·15 per cent. The proportion of clean cotton to seed is reported to be usually about 33 per cent, and an exceptionally good crop will give 35 or 36 per cent. The inference is that the season unfavourably affected the crop and caused a lower percentage of lint than usual.

The field under experiment was not manured this year. It appears to have been fairly tilled however. The outturn is, I think, estimated correctly at half the maximum. The price throughout the cotton season varied from Rs. 69 to Rs. 76 per *bhár* of 24 maunds of 40 *seers* of 38½ *tolas*.

The results are as under :—

	Anna Estimate.	Outturn of Seed Cotton per Acre.	Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
	As.	Lbs.	Rs. a. p.	Rs. a. p.	
Experiment No. 21 ...	10	227	17 6 9	5 12 3	33·09

This officer's sesamum test (No. 22) was taken on a black soil field assessed at Rs. 3-8 per acre. Cotton and sesamum are grown in alternate years. The field was unmanured this year, but lightly manured by folding sheep in the previous year. The seed was drilled in August, the seed-rate being 1 lb. per acre, which is about average. The crop ripened at the end of January. It was damaged to a considerable extent by late rains. The outturn is much over-estimated at 12 annas.

The yield, 153 lbs. oil-seed per acre, is valued at Rs. 11-5-8. The by-product was not valued. It is only useful as fuel. The incidence works out 30·82 per cent. This is high. Sesamum is a precarious crop. It is, however, a good preparation for cotton which is undoubtedly the rent-paying dry-crop in Broach. In the year when sesamum is grown there is a good opportunity for thoroughly working and cleaning the land, the sesamum being sown generally late, and the cotton of the following season undoubtedly benefits.

Surat.

Only one test on sugarcane by Mr. Cadell has been reported from this district. Mr. Kotváľ was prevented through illness from completing the rice tests begun by him. Mr. Wood attempted some tests in *bájrí*, but found the results unsatisfactory and did not report them. Later on, owing partly to ill-health and partly to heavy work, he did not conduct any experiments. Mr. D'Souza's omission to do any experiments has been unexplained.

Mr. P. R. Cadell, Assistant Collector,

Submits a sugarcane test. The report is full, excepting that it is not clear whether the anna estimate is based on a 12 or 16-anna average standard. A reference to the Collector has failed to clear the point, because Mr. Cadell, when he gave over charge, left nothing on record to show what standard was adopted.

The field experimented upon is partly *jiráyat*, partly *kidrí*. The embanked portion grows rice during four consecutive years, then sugarcane is taken. It may be that two years' assessment is chargeable against the sugarcane, because this crop

is planted in December. It is, of course, possible that rice may have been grown in the same year, in which case the time between the harvesting of the rice in October and the planting of the sugarcane in December would be almost too short for manuring the field and for the careful preparatory tillage which sugarcane necessarily needs. The *kiári* portion of the field bears an assessment of Rs. 13-8-8 per acre. The land is irrigable from a well situated in an adjoining field. The occupant paid at the rate of Rs. 8-5-0 per acre irrigated, for the right of drawing water from this well. The variety of cane grown was *Vánsi*. It is a hard thin variety. The chief advantage of this variety is that it is hardy and does not require much water. The crop was harvested 13 months after plantation and was irrigated meantime only 14 times. A soft cane in the Poona district would be watered more than twice as often in the same period.

It is reported that *Vánsi* does not give such good results as *Malbári* cane. The latter is a soft tall variety extensively cultivated in the Surat Collectorato, but it is reported that the soil of Jalálpur taluka, in which the test was taken, does not suit this sort. It needs much more water than *Vánsi*. The field under test was fairly manured, 20 cart-loads per acre of ordinary manure (which was all bought) being applied. More ordinary manure would have been applied, but it could not be got. The field was top-dressed with castor cake, Rs. 16½ worth per acre. It is said that the castor cake was applied at the roots of the canes to save them from excessive damp. I do not see how the cake could possibly exercise this effect. Its effect manurially would, of course, be valuable. In Gujarát it has the reputed effect of keeping white ants from attacking and destroying sugarcane. The field was prepared for ploughing in the ordinary way. The sets, 16,661 per acre, were trampled into the mud in the furrows of the previously flooded beds.

The experimenter values the *gul* at about 20½ lbs. per rupee, and the dry stripped leaves at the high rate of Rs. 25 per acre. The green tops were as usual fed to the work bullocks working the cane-mill. The refuse crushed cane was not alone sufficient as fuel for boiling the juice. It was supplemented by *tur* stalks. A three-roller mill was used to express the juice. Six pairs of bullocks in relays of 2 pairs at a time were used to work it.

The outturn results per acre are as under:—

			Lbs.
Weight of canes	...	...	52,976
Weight of juice	...	...	29,341
Weight of <i>gul</i>	...	...	4,945
			Percentage.
Percentage of juice to cane	...	...	55.39
Do. of <i>gul</i> to juice	...	...	16.85
Do. of <i>gul</i> to cane	...	...	9.33

Thana.

Experiments were directed to be made in sesamum, *rági*, gram and sugarcane. No tests could be taken on the first, because its harvest was completed before the commencement of the touring season. Three experiments each on gram and *rági* have been received. Mr. Hudson could not do the sugarcane test owing to press of other work.

Messrs. Hearn and Hudson of the Konkan Revenue Survey carried out some experiments in this district; the former one each on sugarcane and lucerne, the latter 6 on grass.

Mr. L. G. Dēshmukh, Assistant Collector,

Reports two *nágli* tests. One of the fields experimented upon was rather an unfortunate selection. It is reported that "just above this field there is a place for the deposit of the manure heaps of the village, and in the rainy season water flows from it into the land by which it profits considerably". This is not an average condition, and under standing orders experiments should only be taken on average crops.

Each crop was grown on *varkas* land. The field of the first test (No. 24) is assessed at Re. 0-2-11. It apparently grows two *nāgli* crops in succession after one year's fallow, but it is not likely that the practice of taking two crops in three years could be maintained on this land for any length of time. Longer periods of fallows or liberal manuring must necessarily be resorted to. The field was not manured this year. The crop was grown from seedlings raised as usual on a *rābed* seed-bed. The experimenter instituted special enquiries as to seed-rate and proportionate area of seed-bed to acre of transplantation. He reports that the former is about 8 lbs. per acre and the latter as 1 to 4. The season was good on the whole. The October cyclonic rain delayed harvest, but did not damage *nāgli* to the same extent as rice. In this test as well as in the other the experimenter neglects the by-product. The grain, 581 lbs. per acre, is estimated as an average outturn and valued at Rs. 13-2-0 per acre. The incidence is only 1·31 per cent.

The second test (No. 25) was taken on the field which lies under the village manure heaps, and it is quite possible that, as reported, the field only lies fallow one year in four. *Nāgli* is followed by *vari* and *udid* during the short rotation. The assessment is Re. 0-3-4 per acre. No manure was used except in *rābing* the seed-bed. Tillage was good and season as in the previous test. The crop yielded 890 lbs. of grain per acre, worth Rs. 19-6-0. This outturn was locally estimated at the maximum standard. The percentage incidence is only 1·07.

Mr. C. W. M. Hudson, Assistant Collector,

Submits a test on gram and another on *vāl*. Both crops yielded well, the gram especially so. I think the *vāl* is under-estimated at 11 annas. Both were second crops on rice fields. The experimenter refers to the beneficial effect which each crop exercises in smothering weeds also to the ameliorating influence on the soil of all pulse crops. Undoubtedly *vāl* or gram, if grown as second crops in rice fields, act as all good-rotation crops do. Each crop, if it succeeds, is a good preparation for the rice crop of the following season.

The gram (Exp. No. 26) was locally estimated as an 18-anna crop. It might fairly bear the maximum valuation. The late rainfall, though disastrous for unreaped ripe rice, was, of course, beneficial for the gram. The field was ploughed when dry enough after the rice was removed and the gram was broadcasted early in December immediately before the second or cross-ploughing. The second ploughing, no doubt, effectively covered the seed, but the seed was evidently sown on a rough unpulverized surface, and this partially accounts for the unusually high seed-rate of 118 lbs. per acre. Gram was a second crop after rice in each of the last three years. The field is reported to be more retentive of moisture than most rice fields. The crop took over three months to ripen—an indication that it was not hastened to maturity by want of moisture. The assessment is only Rs. 1-8-11 per acre. The gram yielded 957 lbs. of pulse which irrespective of the by-product (the value of which was neglected by experimenter) is valued at Rs. 33-7-0 per acre. The incidence works out 4·65 per cent. This is an exceedingly satisfactory figure if the interest of the cultivator only is considered.

The *vāl* crop (Exp. No. 27), experimented upon by this officer, also yielded well. The season was not altogether favourable, because the heavy rain which fell after the seed was sown interfered, to some extent, with even germination. The survey number has 5 *pot* numbers. There appears to be little variation in the soil as the *pot* numbers bear a pretty equal acre assessment. The field is classed as *kharif* soil. Rice is grown every year and second crops in seasons of favourable late rainfall. Second crops were grown in two of the last three years. This year about 5 per cent of the whole survey number grew no second crop. About 5 per cent grew a second crop of *san* hemp, whilst the remainder was under *vāl*. The *vāl* was broadcasted at a rather high seed-rate, 75 lbs. per acre, in the middle of November. The cultivation of the crop is described as indifferently, but in what respects is not reported. The crop ripened at the end of March and yielded 760 lbs. pulse per acre, which with the by-products is valued at Rs. 16-4-0. The assessment is Rs. 3-13-4 per acre and the incidence works out 23·59 per cent: a result which is quite satisfactory for a second crop in a rice field.

Mr. V. B. Patvardhan, District Deputy Collector,

Submits one *ndgli* and two gram tests. I cannot enter the results of the former in the tabulated statement. The test was taken on good level *varkas* land. The outturn results are exceptionally good, but the experiment is of no value in showing the incidence of assessment, and for this reason is rejected. The crop was raised on a patch of ground liberally rābed with cowdung, branch-wood, &c., as a seed-bed for rice, and the *ndgli* seedlings were planted in this area after the rice seedlings were removed. The whole number measures nearly 19 acres, and it is impossible that the whole area could have been treated in the liberal manner described, and the results are much above average.

One of the gram crops tested by this officer was grown as the sole crop of the year in uneven *rabi* land which grows the same crop every year. The other crop was a second crop in a rice field, second crops of gram or *vāl* being grown only in years when sufficient moisture remains in the soil after the rice is reaped.

The *rabi* field was properly ploughed and seasonably sown. If the land was in good tilth when the seed was sown, as it probably was, there is no reason why less seed should not have sufficed. In both fields the seed-rate is reported as 74 lbs. per acre. I can understand it being so high in the second field, which was not properly ploughed and necessarily must have been in a rough unpulverized condition. The seed was in each field broadcasted and ploughed in. Each field was sown in the third week of November and the crops ripened in the second week of March. Both tests were taken on the same day and in the same village. The season was favourable. The *rabi* field yielded well, the crop being classed as an average one. The rice field yielded poorly, the crop being locally estimated at 8 annas. Necessarily the incidence of assessment in the latter test looks high, but if the value of the rice crop be considered the burden of assessment need not be considered heavy, and is probably as light as it is in the *rabi* field. The cost of cultivating gram after rice would be much less than that of gram in a *rabi* field on account of the frequent ploughings necessarily required for the latter.

The results of the two tests are as under, by-products being neglected in both cases:—

	Anna Estimate.	Outturn of Pulse per Acre.	Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.	Remarks.
	As.	Lbs.	Rs. a. p.	Rs. a. p.		
First field (Exp. No. 28)...	16	827	22 6 4	1 7 7	6.58	Sole crop on <i>rabi</i> field.
Second do. (Exp. No. 29)...	8	281	7 9 7	3 12 5	49.69	Second crop on rice field.

Mr. E. H. Hearn, Deputy Superintendent, Konkan Revenue Survey,

Sends a test on sugarcane and another on lucerne.

The sugarcane experiment (No. 30) was taken on black clay soil, the sub-soil of which is mixed with silt. The field is irrigable by Persian wheel from a well and is assessed at Rs. 4-7-7 per acre. It grows sugarcane or plantains in alternate years with rābed rice seedlings. *San* hemp is grown as a second crop in the same year as the rice seedlings. It is not reported whether the *san* hemp is grown as a green manure or not. In any case it would be a good preparation for either sugarcane or plantains, and this is probably the reason why no manure was applied for the sugarcane before plantation. Three top-dressings of castor cake were given—the first in July 2 months after plantation, the second in August, the third in September. The three applications cost Rs. 100 per acre. The cake was pounded fine, placed round the canes, and covered with soil. The variety of cane tested was dark-purple in colour. 2,200 whole canes cut into lengths of 1 to 1½ feet provided sets sufficient for an acre. The test area is less than the prescribed minimum, because the owner objected to having a larger area cut in one day. After the sets were planted the field was watered at intervals of 8 to 10 days except during the monsoon. It was weeded four times at intervals during the season. In October the canes were wrapped in their

own leaves and again in November, January and February. The canes were also tied up to each other to prevent lodging by wind. In March, 10 months after plantation, the crop was harvested. A wooden mill worked by two buffaloes was used to express the juice. The experimenter gives no details of the *gul*-making process. He reports that the crushed cane is only used as *ráb* and that the tops are useful as fodder. The kind of fuel used in boiling the juice is not noted. The crop yielded 5,789 lbs. of *gul*, which with the by-products valued at Rs. 10 per acre, was worth Rs. 262. This is estimated as a 14-anna outturn. Season and cultivation are each described as good.

This officer's second test (No. 31) was taken on lucerne. It is doubtful whether the results are any guide as to the burden of assessment. The crop was grown as a second crop after rice on deep black clay soil assessed at Rs. 3-14-9 per acre. In tracts of heavy rainfall lucerne is not a permanent crop. It is killed out by monsoon rain. The experimenter estimates that five cuts are obtained during the season of growth, the seed being sown in November and the crop ploughed up in the following May or June. Meantime the crop needs irrigation every 10 days in retentive soil. The crop tested was the second cut since sowing; the first would probably have been less in weight, and it is almost certain that the outturn at each cutting would be considerably less during the very hot weather. I cannot accept the outturn of the second cut as average for the others, particularly as the crop was only lightly manured, 6 cart-loads of goat's manure only being applied. The experiment goes to prove that the cultivation of lucerne within a reasonable distance of Bombay is profitable even though the crop is not permanent, the reason being that lucerne is exceedingly dear in Bombay during the fair season. The demand is mostly supplied by lucerne sent from Poona, and the cost of rail-transport by passenger train (it spoils if sent by goods) is 9 annas per Imperial maund. It can only be profitably sent from Poona if the retail price in Bombay is 60—80 lbs. per rupee. The experimenter says the retail rate in Bombay for lucerne delivered in small quantities at bungalows is 56 lbs. per rupee. He values the outturn of his test area at the wholesale rate of 80 lbs. per rupee. The crop (one cut) yielded at the rate of 6,824 lbs. per acre worth Rs. 85-4-9.

Mr. A. G. Hudson, Assistant Superintendent, Konkan Revenue Survey,

Submits six tests on grass. Four of the fields selected for experiment are classed as *varkas* land, one is classed as rice land, and one as *rabi*. The rice field grew rice until 1884-85; subsequently it was allowed to lie waste for grass because it is a long distance from the village and the lands surrounding it grew grass only. The *rabi* field was entered as Government waste at the time of original survey. It was subsequently purchased by the occupant who says he allows grass to grow on it for *ráb*. He never grew a *rabi* crop on it, and thinks it will not grow one as the subsoil is *murum*.

Mr. Hudson in submitting his report gave no explanatory notes of his tabulated figures. He went on leave soon afterwards and a reference has failed to make all clear. *Ber* grass grew in the rice field and *phul* in the other fields experimented upon. The *ber* is valued at 125 bundles or 198 lbs. per rupee, the *phul* at 100 bundles per rupee. The rate of the *phul* grass in the first three tests ranges from 145 to 150 lbs. per rupee, but in the two next tests the respective rates are 84 lbs. and 240 lbs. per rupee. The latter rate is for an exceptionally heavy crop and the former for a light crop. No doubt a light crop yields a finer quality of grass than a heavy crop, the grass of the latter being tall and coarse. Still I do not see why, weight for weight, the fine grass should be three times as valuable as the coarse.

The anna valuations of two of the crops tested is much lower than that of the others. The season was alike favourable for all the fields. It looks as if the anna valuations were fixed by comparing the crops with those of other fields in the same district in the same year. The anna valuations should have been fixed by taking evidence as to the comparative values of the tested crops with former crops on the same numbers.

Mr. Hudson writing from England has been unable to clear the points referred to. He says: "The experiments were made on grass crops in various situations. It would have been as unfair to the Khátedárs, if I had taken the best

situations as it would have been to Government if I had taken the worst. The experiments must consequently be read together for the average outturn to be determined."

I tabulate the outturn results as under :—

	Description of Grass.	Anna Estimate.	Outturn of dry Grass per Acre.	Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.	Remarks.
		As.	Lbs.	Rs. a. p.	Rs. a. p.		
First field (Exp. No. 32) ...	<i>Phul</i> or <i>Bondhant</i>	18	3,968	27 6 6	0 14 0	3'19	<i>Varkas</i> land.
Second do. (Exp. No. 33) ...	Do. ...	20	4,110	28 0 0	1 11 11	6'25	Do.
Third do. (Exp. No. 34) ...	Do. ...	20	4,904	32 11 6	2 0 0	6'11	Do.
Fourth do. (Exp. No. 35) ...	Do. ...	11	1,764	21 0 0	0 11 6	3'57	Do.
Fifth do. (Exp. No. 36) ...	Do. ...	20	4,760	19 12 10	0 2 10	0'94	<i>Rabi</i> land.
Sixth do. (Exp. No. 37) ...	<i>Ber</i> ...	11	3,164	16 0 0	5 4 10	36'71	Rice land.

The value of outturn is, I think, considerably over-estimated in the 4th test and is probably under-estimated in the 5th, but in the latter the grass may have been so coarse that the valuation is correct. Mr. Hudson, when doing the measurement of Kelve Máhim taluka, enquired into the grass trade of the district which supplies Bombay to a very large extent. He has submitted a very carefully prepared report which has an indirect bearing on the Thána tests and which I will endeavour to epitomize. He says: "The land which produces this grass was originally classed as *varkas* and assessed at 4 annas and less per acre. It is beautiful alluvial land and should never have been classed as *varkas* at all but as *rabi* which it undoubtedly is. It grows an excellent crop of *phul* grass in high situations and of *ber* and *roheda* in lower lying places, and the owners are lucky to have had it at a nominal rental for so long."

The following statements of sale of grass produce on lands in the Pálghar, Padghe, Kelve and Shirgaon Sájas show that the auction price obtained for the right of grass-cutting is on an average many times the assessment :—

Survey Number.	Kind of Land.	Area.	Assessment.	Amount realized in Auction Sale.	Name of Purchaser.
1	2	3	4	5	6
		A. g.	Rs. a. p.	Rs. a. p.	
		<i>Pálghar.</i>			
114	Jiráyat ...	27 3	5 0 0	155 0 0	Hari Prasad Matadin Pardeshi.
135	Do. ...	25 20	5 0 0		
	Total ...	52 23	10 0 0		
		<i>Shelwale.</i>			
31	Jiráyat ...	13 30	1 12 0	17 0 0	Parsharam Mahadev.
		<i>Ambádi.</i>			
19	Do. ...	10 20	1 5 0	20 0 0	Chinto Gopal.
		<i>Warkuti.</i>			
55	Do. ...	26 0	2 8 0	5 0 0	Kanta Girdhari Pardeshi.
56	Do. ...	12 0	1 8 0		
58	Do. ...	18 0	2 4 0		
60	Do. ...	19 0	2 4 0		
	Total ...	75 0	8 8 0		

Survey Number.	Pot Number.	Kind of Land.	Area.	Assessment.	Amount realized in Auction Sale.	Name of Purchaser.
1	2	3	4	5	6	7
			A. g.	Rs. a. p.	Rs. a. p.	
			SA'JA PADGHA.			
			Umbroli.			
87	1	Kharif	3 1 $\frac{1}{2}$	6 8 0	0 3 0	Kolsha Navsha.
			Morekuran.			
13	...	Jirayat	15 0	2 12 0		
14	...	Do.	14 30	2 12 0		
15	...	Do.	15 10	2 12 0		
16	...	Do.	16 0	3 0 0		
17	...	Do.	14 0	2 8 0		
21	1	Kharif	2 22 $\frac{1}{2}$	5 0 0		
22	1	Do.	1 35	4 0 0	60 0 0	Hari Prasad Matadin.
25	...	Jirayat	2 20	0 7 0		
26	...	Do.	3 0	0 9 0		
27	...	Do.	3 20	0 10 0		
28	1	Kharif	1 29 $\frac{1}{2}$	4 0 0		
31	1	Do.	1 26	4 0 0		
60	...	Jirayat	26 0	5 0 0		
		Total ...	117 32 $\frac{1}{2}$	37 6 0		
			Kolgaon.			
17	...	Jirayat	15 0	1 14 0		
18	...	Do.	21 0	2 8 0		
19	1	Kharif	0 27 $\frac{1}{2}$	1 10 0		
20	...	Jirayat	13 0	1 10 0		
21	...	Do.	18 10	2 4 0		
22	...	Do.	19 0	2 4 0		
32	...	Do.	16 0	2 0 0		
56	1	Kharif	2 12 $\frac{1}{2}$	7 9 0	80 0 0	Hari Prasad Matadin.
63	...	Jirayat	21 0	2 8 0		
64	...	Do.	27 0	3 4 0		
65	1	Kharif	0 23 $\frac{1}{2}$	1 4 0		
71	1	Do.	2 6 $\frac{1}{2}$	4 8 0		
74	...	Jirayat	1 20	0 4 0		
47	...	Do.	4 0	0 12 0		
48	...	Do.	2 0	0 4 0		
		Total ...	163 20 $\frac{1}{2}$	33 14 0		
			Nandore.			
27	1	Kharif	0 31 $\frac{1}{2}$	1 10 0		
28	1	Do.	2 2	4 10 0		
28	...	Jirayat	0 25	0 1 0		
29	1	Kharif	2 26 $\frac{1}{2}$	7 0 0		
30	1	Do.	3 18 $\frac{1}{2}$	8 8 0		
31	1	Do.	0 38 $\frac{1}{2}$	2 0 0		
32	1	Do.	0 7 $\frac{1}{2}$	0 6 0		
33	1	Do.	0 8 $\frac{1}{2}$	0 8 0		
34	1	Do.	0 10 $\frac{1}{2}$	0 9 0		
35	1	Do.	1 14 $\frac{1}{2}$	2 12 0		
19	...	Jirayat	15 0	1 14 0		
66	...	Do.	19 0	2 4 0		
73	...	Do.	18 4	2 4 0		
		Total ...	64 21 $\frac{1}{2}$	34 6 0		
			Padghe.			
91	...	Jirayat	4 10	0 6 0	1 0 0	Gopal Krishna Dixit.
			SA'JA KELVE.			
			Tokrale.			
5	...	Jirayat	23 0	2 4 0		
6	...	Kharif	2 23	4 8 0		
7	...	Jirayat	22 0	2 12 0		
8	...	Do.	32 0	4 0 0		
9	...	Do.	27 0	2 8 0		
10	...	Do.	22 30	2 12 0		
11	...	Kharif	2 20 $\frac{1}{2}$	4 8 0		
12	...	Jirayat	23 0	2 12 0		
13	...	Do.	30 20	3 12 0		
14	...	Do.	21 0	2 8 0		
17	...	Do.	25 20	3 4 0		
18	...	Do.	26 0	3 4 0		
19	...	Do.	28 0	3 8 0		
25	...	Kharif	2 12 $\frac{1}{2}$	4 8 0		
26	...	Jirayat	21 0	2 8 0		
29	...	Kharif	0 20 $\frac{1}{2}$	1 0 0		
33	...	Do.	0 38	1 10 0		
		Total ...	310 24 $\frac{1}{2}$	51 14 0	865 0 0	Hari Prasad Matadin.

Survey Number.	Pot Number.	Kind of Land.	Area.	Assessment.	Amount realized in Auction Sale.	Name of Purchaser.
1	2	3	4	5	6	7
			A. g.	Rs. a. p.	Rs. a. p.	
			<i>Kelwe.</i>			
126		Kharif	2 30	4 0 0		
148		Do.	1 20½	3 8 0		
180		Do.	2 31	9 8 0		
181		Do.	2 25½	9 0 0		
260		Do.	2 10½	4 12 0		
265		Do.	4 17½	7 0 0		
266		Do.	0 33½	1 12 0		
281		Do.	0 31½	1 8 0		
293		Jirayat	9 0	1 10 0		
327		Do.	25 33	5 0 0		
329		Kharif	2 21½	5 0 0		
331		Jirayat	35 7	6 8 0		
353		Do.	4 0	0 12 0		
359		Do.	13 20	2 8 0		
361		Do.	17 0	3 4 0		
362		Kharif	2 34½	6 0 0		
363		Do.	2 25	5 8 0		
364		Do.	2 38½	6 0 0		
366		Jirayat	31 0	6 0 0		
367		Do.	26 0	5 0 0		
368		Do.	23 0	4 8 0		
371		Do.	22 12	4 3 0	500 0 0	Hari Prasad Matadin.
374		Do.	16 12	3 4 0		
383		Do.	2½ 0	4 8 0		
384		Do.	4 15	1 0 0		
387		Do.	9 23	2 0 0		
388		Do.	8 20	1 12 0		
389		Kharif	1 4½	2 4 0		
390		Do.	1 5	2 4 0		
391		Jirayat	6 3	0 12 0		
442		Kharif	2 6½	4 8 0		
477		Jirayat	2½ 7	3 4 0		
500		Kharif	0 19½	1 0 0		
503		Jirayat	12 0	2 4 0		
505		Do.	30 23	4 0 0		
518		Do.	24 0	4 8 0		
519		Do.	20 20	3 12 0		
520		Do.	19 30	3 12 0		
540		Do.	18 0	2 4 0		
552		Do.	23 20	5 8 0		
564		Do.	19 14	3 12 0		
575		Kharif	2 18½	5 8 0		
582		Do.	5 34½	14 8 0		
		Total	511 26	179 1 0		
			<i>SA'JA SHIRGAON.</i>			
			<i>Aly dli.</i>			
46	1	Kharif	1 4½	2 12 0	4 0 0	Kanta Girdhari Pardeshi.
48	1	Do.	1 33½	4 8 0		
52	1	Do.	1 7½	2 8 0		
		Total	4 5½	9 12 0		
			<i>Tembhada.</i>			
84		Jirayat	20 6	3 13 0	120 0 0	Hari Prasad Matadin Pardeshi.
85		Do.	20 30	4 0 0		
86		Do.	13 0	2 8 0		
		Total	53 36	10 5 0		
			<i>Dipoli.</i>			
4	1	Kharif	0 30½	1 14 0	8 0 0	Hari Prasad Matadin.
9	1	Do.	0 13½	0 13 0		
30	1	Do.	0 27½	1 12 0		
56	1	Do.	0	0 1 0		
62		Jirayat	31 4	6 0 0		
63		Do.	33 10	6 0 0		
64		Do.	40 0	7 8 0		
65		Do.	36 0	6 8 0		
66		Do.	44 0	8 0 0		
67		Do.	44 0	8 0 0		
68		Do.	45 0	8 8 0		
69		Do.	30 0	5 8 0		
		Total	305 6½	60 8 0		

Mr. Hudson saw 6 waggons loaded with *ber* hay at Pálghar, which carried 27,000 bundles. The freight charged on each waggon was Rs. 11. Mr. Hudson found the weight of a *ber* bundle to be 1·8 lbs. on an average and average girth 17 inches. *Roheda* bundles weighed 1·84 lbs. each and girthed 16½ inches. *Phul* weighed 1·24 lbs. per bundle and girthed 20·3 inches.

The following expenses were incurred for *ber* hay delivered in Bombay :—

	Rs.	a.	p.
Cutting, bundling and stacking 27,000 bundles at			
Re. 1 per 500 bundles ...	54	0	0
Carting to station at 8 annas per cart-load of 500 bundles ...	27	0	0
Loading 6 rail waggons ...	6	0	0
Unloading 6 rail waggons ...	3	0	0
<i>Dalál's</i> fees on 6 waggons ...	12	0	0
Freight charges to Bombay ...	66	0	0
	168	0	0
Price of 27,000 bundles of <i>ber</i> in Bombay at Rs. 14 per 1,000 ...	378	0	0
Difference ...	210	0	0

Taking Mr Hudson's figures as to average weight of *ber* bundles, and considering the outturn results of his crop test it may perhaps be assumed that the 27,000 bundles weighing in the aggregate 48,600 lbs. were got from 15 acres of land, the assessment of which would be less than Rs. 4. It would have been, however, more conclusive if actual tests had been taken in the field. I can say with positive assurance based on personal observation that last year between Saphála and Pálghar most of the grass would certainly have yielded 1½ tons or more of hay per acre, and I can without any hesitation accept the statement that hay cut from 15 acres assessed at Rs. 4 would be worth to the registered owners of the field in Bombay Rs. 210 in excess of expenses incurred in harvesting and marketing. This represents an annual income of Rs. 14 per acre.

Mr. Hudson says "the grass pays so well that it is not worth the while of the owners to turn the more favourably situated portions of their fields into rice. Grass wants no attention and goes on improving year after year." Mr. Hudson further says *ber* grass seldom sells in Bombay for less than Rs. 14 per 1,000 bundles. It usually fetches Rs. 16 per 1,000; if the demand is great, Rs. 18. If the demand is very great it sells for even more. Similarly *phul* grass seldom sells for less than Rs. 12 per 1,000 bundles; it usually fetches Rs. 14, and if the demand is great, Rs. 16 or more. Mr. Hudson bought grass for his own use at Pálghar at Rs. 7-8-0 per 1,000 bundles, and at Makimsar at Rs. 6-0-0 per 1,000 bundles.

Mr. Ozanne has made the following note:—"Mámlatdár says in the neighbourhood of Pálghar the dry-crop land is sublet for from Rs. 5 to Rs. 8 per acre for grass, the lessee bearing all expenses of watching, cutting, carting, &c. &c. The assessment is about 3 annas or 4 annas per acre. In this year Mámlatdár reported that 81 acres of *gurcharan* had been unauthorizedly occupied. The grass was put up to auction and fetched Rs. 520, besides local fund Rs. 32. The land is claimed and the money is in deposit pending decision. A Pársi was granted about 1,000 acres of *gurcharan* about 5 years ago for about Rs. 31,000. This year he sublet the land for the grass for Rs. 7,000."

CENTRAL DIVISION.

Kha'ndesh.

In this district each experimenter was requested to make two experiments on *bājri* and one each on wheat and sesamum. The programme has been fairly carried out. Less than the required number of tests on sesamum were taken because the crop was mostly harvested before the commencement of the touring season. Two experiments have been rejected for reasons given below.

Mr. K. R. Bamanji, Assistant Collector,

Reports two wheat tests (Exp. Nos. 38 and 39). Each field has black cotton soil. Both fields are assessed at practically the same rate, the acre assessments being respectively Rs. 2-15-2 and Rs. 2-15-1 per acre. The lower assessed field has an uneven surface and grew the worst crop. The fields are some distance from the village, but this is not the only reason why manure was not applied. Throughout the taluka fodder is scarce. The area of grazing is limited and large numbers of cattle are sent for the greater part of the year to the Sātpudas to graze and thus manure is scarce.

The first field grew during the last three years mostly rabi crops; wheat, sesamum and gram occupying in each year separate areas in the number. The sequence of cropping in the second field during the last three years was (1) cotton, (2) *bājri*, and (3) *jowāri*, wheat and tobacco. No portion of either field is double cropped in any year. The season for wheat was unfavourable. There was heavy rain soon after sowing, which was harmful. There was rain again in January. The cloudy weather and high winds which accompanied the rain at this time unfavourably affected the wheat crop.

The results are tabulated below for comparison:—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		Principal product.	By-product.			
	As.	Lb.	Lbs.	Rs. a. p.	Rs. a. p.	
First field (Exp. No. 38) ...	16	661	897	17 12 1	2 15 2	16-60
Second do. (Exp. No. 39) ...	16	502	615	13 4 3	2 15 1	22-18

The burden of assessment is apparently not light. I think the crops might fairly be classed at a lower anna estimate or at any rate the land, if more liberally farmed, would give much better results.

Mr. J. H. DuBoulay, Assistant Collector,

Submits five tests—two each on *bājri* and sesamum and one on wheat. The experiments are clearly and fully reported. In each case the assessment is that of the original survey.

I will first contrast the *bājri* tests. The first field experimented upon (No. 40) has light red *madhyam barad* soil, assessed at Re. 0-5-10 per acre. During the last four years two crops of *bājri* and one of sesamum were grown. One year the land lay fallow. The tested crop "was a good sample of the ordinary *bājri* grown without much care on the poorer land, of which there is a good deal in the Pimpalner taluka." No manure was applied and the cultivation is described as indifferent. The second field (Exp. No. 41) has good dark soil not quite dark enough to be called black. Still it grows cotton occasionally. The crops taken during the last four years were sesamum, cotton, *bājri*, and *kulthi*. The assessment is Re. 0-9-9 per acre. Comparing the crop with that of the other

field, the experimenter says it "is a good specimen of the produce of more careful cultivation and better land. There is plenty of the same kind of crop to be seen in the *táluka*". The cultivation is described as good. The field was manured with about 9 cart-loads of cowdung per acre. The field with the lighter soil required, as usual, a higher seed-rate. The respective rates were 8 lbs. and 5½ lbs. per acre. The latter rate is under average. In each field the seed was sown about the 1st of July and the crops were reaped early in November. The season was middling. Hardly any rain fell for six weeks in the middle of the monsoon. The field with lighter soil probably suffered more from the long break. The experimenter expressly states that the anna valuations in all his tests have reference only to previous crops on the same lands.

The *bājri* results are as under :—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage incidence of Assessment.	Remarks.
		Principal Product.	By-product.				
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.		
First field (Exp. No. 40).	16	295	575	5 15 40	5 10	5.54	Light soil.
Second do. (Exp. No. 41).	20	829	2,905	20 15 00	9 9	2.91	Darker better soil.

The poor results in the one field and the satisfactory results in the other may chiefly be attributed respectively to poor and good farming.

Mr. DuBoulay exercised judicious discrimination in selecting the sesamum fields experimented upon and also in selecting his test areas. One of the fields (Exp. No. 42) has light red soil similar in class to that of the first *bājri* field, the assessment being Rs. 0-5-9 per acre. The second experiment (No. 43) was made on a distinctly darker and better class of soil. The assessment is Re. 0-10-11 per acre. This field grows cotton, *bājri* and sesamum in rotation. The other field grows these crops and also *kulthi*. This pulse is a common crop on very light land in Khandesh. It is difficult to understand how cotton can be grown successfully on such light soil unless manure is liberally applied and the rainfall is timely and sufficient. The sesamum like the *bājri* suffered from a long break in the rains. The light soil field was fairly manured with about 9 loads cowdung per acre. The cultivation otherwise was only fair. In this field the seed-rate is reported at 5 lbs. per acre; in the heavier soil field, at 2 lbs. per acre. The latter rate should be ample for any soil. The seed is so small that a small quantity is sufficient if the seed is sown with sufficient care to secure even distribution.

The crop on the heavier soil field was much better on half the field than on the other, the difference being due to the effect of manure. Half the field was liberally manured with 24 carts cowdung per acre, and as regards the crop on this portion the experimenter says "I have not seen a better crop so far as outward appearances go." He further says "the unmanured portion is a fair sample of what may be seen in most of the better lands growing *tili* in the *táluka*." Test areas were selected in the manured and unmanured portions of the field and the outturn results as tabulated below form a striking contrast :—

	Anna Estimate.	Outturn of Seed per Acre.	Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment	Remarks
	As.	Lbs.	Rs. a. p.	Rs. a. p.		
First field (Exp. No. 42) ...	12	282	14 7 3	0 5 9	2.48	Light soil.
Second do. (Exp. No. 43).	19	496	23 11 2	0 10 11	2.87	Liberally manured portion.
	19	200	9 7 8	0 10 11	7.91	Unmanured portion.

This officer submits a test (No. 44) on unmanured irrigated wheat grown on shallow red *barad* soil with scattered stones. The land is classed as *bagayat* and is assessed at Rs. 5-15-0 per acre. The field is irrigable from an irrigation channel and the water is available all the year round except at the end of the hot weather. A water-rate of 4 annas per acre for sugarcane and 2 annas per acre for other crops is charged in addition to the *bagayat* assessment. The field grows sugarcane, rice and wheat in consecutive years. It is probable that the sugarcane is liberally manured. Yet the cultivator could hardly expect a good irrigated crop of unmanured wheat from land continuously under irrigation, and especially as crops of the cereal family are only grown and therefore no appreciation of the value of rotation is shown. I quote from the experimenter's report as follows:—"I cannot call the crop a representative one; for though there are similar *bagayat* lands in the neighbourhood, a number of them have been allowed to lie fallow and only the best lands were put under wheat and then the wheat was not ripe. The wheat of experiment was a good 2 annas worse than the other *bagayat* wheat in the neighbourhood which seemed to be on better land."

"On the whole I think the field over-assessed, and I am the more inclined to think so because in the neighbourhood of Dahivel the people universally complain with regard to waste *jirayat* land that they cannot pay an occupancy price of five times the assessment. The land, they say, is so poor that they have to leave it fallow for three years after cultivating for three years. If there has been over-assessment of *jirayat* the same error may have occurred with regard to *bagayat*, but without accurate knowledge of the outturns from rice and sugarcane it is hardly possible to form a satisfactory opinion."

The wheat outturn results are as under :—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		Principal Product.	By-product.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
Experiment No. 44	13	769	1,190	19 11 5	5 15 0	30-11

The grain is valued at the cheap rate of 41½ lbs. per rupee. The burden of assessment appears high, and if district officers believe this to be the case, a few tests taken on representative crops cultivated with average skill will tend to prove whether the burden is heavy or not. It certainly cannot be concluded that it is heavy from the results of a single test.

Mr. C. N. Seddon, Assistant Collector,

Reports two wheat tests. One crop was irrigated, the other was dry. I cannot accept the reported seed-rates as accurate. They are much above average. The dry-crop seed-rate is higher than that of the irrigated crop. Ordinarily the reverse would be the case. The respective rates are 108 and 94 lbs. per acre. In other respects the results are quite satisfactory and carefully reported.

The dry-crop (Exp. No. 45) was grown on black cotton soil, assessed at Rs. 2-10-8 per acre. During the last four years linseed, *jowari*, wheat and cotton were grown. These are the ordinary crops taken on black soil. They were rotated with each other but in no definite manner. *Udid* and *tur* are grown subordinate to *jowari*. Wheat with a sprinkling of maize occupied the whole number in 1894-95. The maize was removed before the wheat was ripe and probably was grown as a green fodder. It makes rapid growth under favourable conditions and a sprinkling would not interfere much with the slower growing wheat. The tillage was fairly good. A light dressing of ordinary manure, 5 loads per acre, was applied before the rains. The field was ploughed in July. The subsequent tillage is not referred to. Probably the harrow as

usual was used at short intervals during the monsoon season to keep the land free of weeds. The seed was drilled with a two-rowed drill in October. The season was fairly good.

The irrigated crop (Exp. No. 46) was not irrigated in the true sense of the term. Two waterings were only given late in the season. This is a common practice generally throughout the Deccan, not only for wheat but also for gram. No extra expense is incurred as with other irrigated crops except for watering. It is unnecessary to prepare the field for irrigation by forming beds or water compartments in the ordinary way. The water when applied is led over the field in the best way the cultivator can, and a good deal of water is required, because so much pours into the cracks and descends into the subsoil at once. The crop was irrigated from a well which was constructed three years ago. The cultivator has since been able to grow a greater variety of crops. In addition to the ordinary dry-crops of black cotton soil, groundnut, chillies, brinjals, onions and garlic have been grown. These crops, especially the two latter, require regular irrigation in the rabi season. The field bears an assessment of Rs. 2-9-5 per acre. The wheat crop was unmanured. If the crop had been regularly irrigated the cultivator would have been compelled to apply manure liberally. Because irrigation is costly and only a good irrigated crop pays. There was not such a real necessity for manure as the crop was only twice irrigated. All the same if manure had been applied, the outturn would probably have been considerably enhanced. The seed was drilled in October and reaped in the last week of February.

The results from each field are contrasted below :—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.	Remarks.
		Principal Product.	By-product.				
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.		
Experiment No. 45 ...	18	803	960	30 7 0	2 10 3	8.76	Dry-crop. Irrigated crop.
Experiment No. 46 ..	14	779	888	29 6 0	2 9 5	8.81	

The rates are of the revision survey and the burden of assessment is very light.

Mr. S. B. Chitgubi, District Deputy Collector,

Submits three tests on wheat and three on *bājri*. Two of the wheat tests I report with some misgiving, because one sample *ser* weighed $7\frac{1}{2}$ *tolas* more than the reported weight; whilst the other weighed 12 *tolas* less. The difference is not explained, excepting that the experimenter himself did not see to the fastening up of the sample bags, but instructed a peon to do so. This would be sufficient reason to exclude the tests from record, but there is almost clear evidence that the weights on which the experimenter based his calculations are correct. Each sample of grain was very good, the bushel weights are approximately the same, and it is, therefore, impossible that there could be any great difference in the weights of the respective sample *ser*s. The experimenter reports the weights to have been $151\frac{1}{2}$, 150 and 150 *tolas*, whilst the weights found in my office were 158, $138\frac{1}{4}$, and $149\frac{3}{4}$.

The wheat crops tested (Exp. Nos. 47—49) grew on black soil fields, assessed at, respectively, Rs. 2-12-5, Rs. 2-3-8 and Rs. 2-8-5 per acre. The rotations in each field are more or less undefined. It may, however, be accepted that cotton is the principal and rent-paying crop, and that *jowāri*, wheat, gram and occasionally other crops are rotated with it. In the third field mixed cotton and indigo was the crop of 1893-94. The indigo would be a good preparatory crop for the tested wheat crop. Therefore there was no great necessity for manuring this field for wheat, and no manure was applied. The other fields were manured with 6 cart-loads per acre of cattle manure to the first field and 7 carts per acre to the other. Each field was carefully ploughed. The culti-

vation in each case is described as good and the season fair. The seed in each field was drilled about the middle of October in the first two fields, at the end of the month in the third. The seed-rates vary; all are above average; the respective reported rates are 65, 80 and 54 lbs. per acre. Almost exactly four months elapsed between seed-time and harvest: an indication that there was sufficient moisture in the soil and that the crops were not hastened to maturity.

The occupant of the first field (Exp. No. 47) cultivates in all about 30 acres, and pays Rs. 67 assessment. He has one hired servant, who gets Rs. 50 per annum. The family consists of 3 men, 2 women, and a 10-year old boy. The cultivator owes Rs. 700. In addition to two pairs of plough cattle, he owns 2 milk buffaloes and 1 cow: an indication that he is not hard pressed.

The owner of the second field (Exp. No. 48) occupies about $40\frac{1}{2}$ acres as registered owner and rents under a lease $26\frac{2}{3}$ acres, assessed at Rs. 48. The conditions of tenancy are not reported. He owns 3 pairs of bullocks, 1 cow, 1 milk buffalo, and 1 calf. The family consists of 3 men, 3 women, 2 girls, and 2 boys. Four servants at Rs. 5 per month each are employed. The cultivator is himself a servant of a banker; one son is a trader. Last year a son was married and a debt of Rs. 1,000 was incurred for the purpose. It is doubtful whether the land occupied, 67 acres, can be properly cultivated by 3 pairs of bullocks.

The owner of the third field (Exp. No. 49) occupies in all as registered owner 67 acres 23 gunthas assessed at Rs. 109. He has 8 bullocks, 1 milk buffalo, and 2 cows. The family consists of the cultivator, 3 women, 1 daughter, and 2 sons. He owes a debt of Rs. 600, but is apparently well-to-do as he owns a house worth Rs. 1,200. He employs two hired servants at Rs. 52 per annum, and does not work himself.

The outturn results from the wheat fields are in each case satisfactory. They are as under:—

	Anna Esti- mate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		Principal Product.	By- product.			
		As.	Lbs.	Rs. a. p.	Rs. a. p.	
First field (Exp. No. 47) ...	16	772	1,231	25 6 8	2 12 5	10.92
Second do. (Do. 48) ...	16	904	1,292	29 6 5	2 3 8	7.58
Third do. (Do. 49) ...	18	696	1,313	26 11 10	2 8 5	9.44

The outturn results of Mr. Chitgubi's *bājri* tests are also of doubtful accuracy. The samples of grain sent to my office weighed respectively $2\frac{1}{2}$, 3, $3\frac{1}{2}$ *tolas* more than the reported weights.

The first field tested (Exp. No. 50) is rented by the cultivator. The terms of tenancy are not reported. The cultivator occupies other fields apparently as registered owner. The entire holding extends to $55\frac{1}{2}$ acres, the assessment being Rs. 65. The cultivator owns 4 pairs work cattle, 10 cows, 5 calves, and 2 milk buffaloes. He has to buy fodder. He, however, plies one pair of bullocks and a cart for hire. The family consists of 3 men, 3 women, and 2 daughters. Four servants are employed, 2 at Rs. 5 per month and 2 at Rs. 50 per year.

The two other fields (Exp. Nos. 51 and 52) are cultivated by one man. One field he rents from an Inámdár, the other he owns. He also cultivates two other numbers. The entire holding extends to 69 acres 22 gunthas, the Government assessment being Rs. 71. He owns 3 pairs of work cattle, 3 cows, 4 calves, and 2 milk buffaloes. He buys some fodder and uses all he grows. The family consists of 4 men, 8 women, 5 sons and 7 daughters. The cultivator is a trader. He has built himself a new house which cost Rs. 800.

He is a Lásáka Bania by caste, and neither he nor the members of his family labour in the field. He has 6 paid servants, of whom 4 work in the field and 2 in trade. It is safe to conclude that the Inámdár landlord gets some advantage in renting his field to the Bania tenant, who does not work. It is also safe to conclude that the Bania tenant profitably cultivates the field by means of hired labour. Otherwise, he would not take the trouble to do so as he is not dependent upon the produce for a living. Under these circumstances the burden of assessment must necessarily be light.

In the first field four crops of *bájri* have been grown during the last four years. In the other two fields cotton is apparently taken when the early rains are favourable, *bájri* in other years. There was in each field one cotton crop and three *bájri* crops grown during the last four years. The season for each tested crop was fairly good. Tillage is described as good, but each crop was unmanured. The first field was sown in August, the other two in July. The seed-rates are below average, being respectively $5\frac{1}{2}$, $4\frac{1}{2}$ and $4\frac{1}{2}$ lbs. per acre.

Outturn, &c., results are as under :—

	Anna Esti- mate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assess- ment.
		Principal Product.	By-pro- duct.			
		As.	Lbs.	Rs. a. p.	Rs. a. p.	
First field (Exp. No. 50) ...	16	258	1,568	8 0 6	0 10 6	8.17
Second do. (Do. 51) ...	16	418	1,369	12 7 4	1 2 2	9.11
Third do. (Do. 52) ...	16	362	1,037	10 10 10	0 15 0	8.78

Mr. Kázi Kamruddin, District Deputy Collector,

Submits two tests on *bájri* and one on wheat.

The *bájri* in one of the fields had a slight sprinkling of *jowári*, in the other of *math*. Both subordinate crops were neglected.

The first field (Exp. No. 53) has fairly good red soil, assessed at Re. 1-4-0 per acre. It grows cotton occasionally, but is mostly cropped with *bájri* and subordinate mixtures. The second field (Exp. No. 54) has light *barad* soil of inferior description, more suitable probably for *bájri* than for any other crop. The assessment is Re. 0-6-3 per acre. The season was unfavourable. A long period of drought followed favourable early rains. The drought no doubt unfavourably affected the second field most. Each field is manured once in five years. The tested crop in the first field was directly manured. The second field was last manured in 1892. The cultivation of each field is described as good. The seed-rate, $4\frac{1}{2}$ lbs. per acre, in the first field, is perhaps under-estimated; that of the second field, 9 lbs. per acre, is nearer average. The experimenter reports that the most of the *bájri* crops in his charge were harvested before the instructions as to taking experiments reached him on 16th October. The best *bájri* crops on black soil were already cut, and the fields selected did not grow average crops for the district. The principal product in the second test is valued at a considerably cheaper rate than in the first, presumably on account of its inferior quality.

The results are as under :—

	Anna Esti- mate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assess- ment.
		Principal Product.	By-pro- duct.			
		As	Lbs.	Rs. a. p.	Rs. a. p.	
First field (Exp. No. 53) ...	10	511	1,546	16 7 9	1 4 0	7.53
Second do. (Do. 54) ...	8	240	769	7 5 11	0 6 3	5.30

This officer's wheat test (Exp. No. 55) was taken on black cotton soil assessed at Rs. 2-6-6 per acre. Cotton, *jowari*, *bajri* and wheat have each been grown during the last three years, and three of these crops occupy different portions of the field in any particular year. The whole number extends to 11½ acres, and wheat occupied this year three acres of the test field which was manured in May with about 8 cart-loads ordinary manure per acre. The cultivation is described as good, but in what respects is not shown. In Khándesh the preparatory tillage for wheat is usually very careful, and as manure was applied in May it is probable that the field was ploughed repeatedly during the monsoon. Careful preparatory tillage for wheat also benefits the cotton of the following year and is usually undertaken to free the soil of deep-rooted weeds which get established in cotton years. The reported seed-rate, 73 lbs. per acre, is decidedly over average. The seed was drilled with a heavy two-coulter drill in October. The crop ripened early in February. The season was favourable. The crop yielded well. 735 lbs. grain and 1,380 lbs. of useful by-product per acre are together valued at Rs. 26-3-2. This outturn is, I think, under-estimated at 12 annas.

Mr. Shitārām Dāmodar, District Deputy Collector,

Submits two *bajri* tests, the results of which are not satisfactory and are not reported for reasons given below. The sample *sers* of grain in the first and second tests weighed in my office respectively 12½ and 4 *tolas* less than the reported weights. The experimenter's explanation is that the difference is due to dryage, and he says further that there was more dryage in the grain of the first test than in the second because in the second the grain "was better seasoned and more solid" when the crop was harvested. In effect the experimenter admits that the grain was measured before it had dried properly, and that the grain of the first experiment required more drying than that of the second, the latter crop being fully ripe when harvested. A difference of 12½ *tolas* per measured *ser* makes a difference of approximately 9 per cent in the gross outturn. The grain in each case is valued at the same rate in measure *sers* per rupee. The grain of the second experiment was decidedly the better sample. On reference it is explained that the buyer makes no distinction as to quality. If this statement is accepted, then the best sample was worth less in lbs. per rupee than the inferior sample; the respective rates being approximately 37 and 34 lbs. per rupee. *Bajri* straw and chaff are everywhere in the Deccan recognized as comparatively inferior fodder. In the first test the by-products are valued at 308 lbs. per rupee; in the second test, at Rs. 20-0-10 per acre or 136 lbs. per rupee. The latter is an exceedingly high rate. On reference the experimenter explains that Bhusával (in the neighbourhood of which the test was taken) is a very busy station, inferring, I suppose, that there is a keen demand for fodder. The *bajri* straw, he explains, is not brought freely to market, being considered the most nourishing food for cattle, and the owners store the *bajri* fodder and refuse to sell it unless a higher price is offered than for grass and other ordinary fodder. Notwithstanding this explanation, I consider the valuation exceedingly high.

Na'sik.

Eight experiments have been sent in by district officers from this district. Mr. Stewart could not do the rice test owing to his absence on leave. Mr. Carmichael found no opportunity to undertake the sesamum test, and so he did one on gram instead. The programme was fairly worked out. Mr. Lord's omission to experiment has not been explained.

Mr. Hampton, Assistant Superintendent, Deccan Revenue Survey, submitted 7 experiments, of which 3 have been omitted for reasons recorded. Mr. Ichhárām, Acting Superintendent, Land Records and Agriculture, C. D., forwarded 4 well reported tests, 2 on linseed and 2 on gram.

Mr. R. B. Stewart, Assistant Collector,

Submits a test on sugarcane and another on gram.

The sugarcane (Exp. No. 56) grew on a black soil field, assessed at Rs. 9-6-2 per acre for soil and water combined. The field is irrigable from a *bandhára*, the stream being perennial. The following is the ordinary rotation

of crops :—(1) maize and wheat, (2) groundnut, and (3) sugarcane. The variety of cane grown is *kade us*, a small hard sort, which, I think, is more commonly known as *vānsi* in Gujarāt. It is reported that larger white canes will not grow on this land, and that the *gul* from the small canes, though less in quantity, is more valuable as it keeps better. The experimenter estimates the cost of cultivation at approximately Rs. 200 per acre, the manure applied being valued at 8 annas per cart-load. I think the cost of harvesting, crushing and boiling is over-estimated at approximately Rs. 135 per acre. These processes in the Poona district would cost much less even for a much heavier crop. In the memorandum of cost no charge is made for the labour necessary for the repeated waterings. The cultivator has a large family and a considerable number of cattle. He pays nothing for manure and all the labour except for *gul*-making is performed by members of the family. The cane was a 12 months' crop harvested in March. The season was excellent, and the cultivation good, 41 loads approximately per acre of ordinary manure having been applied. I do not think the reported seed-rate, 2,000 small canes per acre, would be sufficient. The crop yielded 8,000 lbs. of *gul* per acre. This at the cheap rate of 20½ lbs. per rupee was worth Rs. 390. There was no saleable by-product, the green tops being fed to the cattle working the mill. The cultivator bought this year a Poona iron-mill.

The gram test (No. 57) by this officer did not give satisfactory results. The field, which has black soil, is irrigable by *pat* from a *bandhāra*, and bears a consolidated assessment of Rs. 8-12-0 per acre, is double cropped every year. Generally gram follows *bājri* or sesamum. Occasionally rice is grown. The tested crop was irrigated, but the extent of irrigation is not noted. Probably as usual the crop was only once or twice irrigated as it approached maturity. The rain crop was liberally manured with ordinary manure. The seed, 33 lbs. per acre, was broadcasted by hand in the furrow behind a plough. The season was excellent, but the crop was poor. It is assessed at 10 annas and yielded 431 lbs. pulse, which with the by-product is valued at Rs. 11-14-0 per acre. The market rate, 38½ lbs. of pulse per rupee, is low. The incidence, 73.68 per cent, is decidedly high even for a second crop.

Mr. G. Carmichael, Assistant Collector.

Submits two tests on gram and one on *jowāri*.

The first and third tests may be compared. The field in the first experiment (No. 58) had friable black dry-crop soil assessed at Re. 1-8-11 per acre. It grows only one crop in a year. Wheat alternates with *bājri*, gram and linseed on different parts of the field. The test crop was manured with six carts of cattle-dung and town-sweepings per acre. Thirty-eight pounds of seed sown in the middle of October produced in 3 months 870 lbs. of pulse and 440 lbs. of useful by-product per acre, together worth Rs. 22-6-1.

Field in Mr. Carmichael's third test (No. 60) had similar soil 1½ foot deep, but impregnated with lime. It is assessed at Re. 1-8-2 per acre for soil and water combined and double crops are taken every year. *Bājri* is grown as a first crop followed either by gram or wheat, which are assisted by irrigation from a *kacha bandhāra*. The gram under test was so irrigated, but its extent is not reported. Probably it was watered only once or twice as it approached maturity. No manure was applied to the field this year. Fifty-one pounds of seed drilled through a three-coulter tube in the middle of October gave at the end of February 946 lbs. of pulse and 385 lbs. of by-product, together valued at Rs. 20-2-6. The gram in this case is valued at a very cheap rate, 49½ lbs. per rupee as against 42 lbs. in the first test. The crop is certainly under-estimated at 12 annas. The incidence works out 7.49 per cent., which for a second crop seems quite low.

Shālu jowāri with a sprinkling of safflower formed the subject of this officer's second experiment (No. 59). The soil is medium black assessed at Re. 0-9-6 per acre. *Jowāri* alternates with *bājri* on this field. This year the field was lightly manured by folding sheep. The season was favourable except that the heavy rain in November laid the crop in places. Tillage is described as good. A poor crop was obtained. The outturn was only 171 lbs. of grain, and 865 lbs. of *kadbi*, together worth Rs. 6-11-2. The grain was very inferior in quality, and is valued at the cheap rate of 63 lbs. per rupee.

Mr. C. M. Thatte, District Deputy Collector,

Submits three tests, one each on *nāgli*, rice and sugarcane.

The *nāgli* (Exp. No. 61) was grown on red *māl* land assessed at Re. 0-4-3 per acre. It is apparently left one year fallow in three. It was fallow in 1892-93, and the crop tested was the second *nāgli* crop taken since. The crop was raised as usual from *rābed* transplanted seedlings. The seed-bed was not *rābed* liberally, only branchwood and grass being used. No manure was applied to the field. Tillage is described as indifferent, but season good. I cannot accept the reported seed-rate as accurate; $2\frac{1}{2}$ lbs. of seed broadcasted on a $1\frac{1}{2}$ guntha seed-bed could hardly supply seedlings sufficient for an acre of transplantation. The value of the by-product is neglected by the experimenter, but this is more than counterbalanced by the high rate of the principal product. The reported market rate is $36\frac{1}{2}$ lbs. per rupee. In this officer's next test taken in the same *tāluka* he values *Kamod*, the finest variety of rice, at 45 lbs. per rupee. *Kamod* rice might easily be dearer, but could hardly be cheaper than *nāgli* in the same market town almost at the same date.

The *nāgli* was sown late and ripened late (end of November).

The outturn results are as under :—

		Anna Estimate.	Outturn of Grain per Acre.	Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		As.	Lbs.	Rs. a. p.	Rs. a. p.	
Experiment No. 61	...	14	1,168	32 0 0	0 4 3	0·83

The burden of assessment appears very light. The assessment is according to revision rates.

Mr. Thatte's rice test (No. 62) was taken on a black soil field, which is irrigable by *pāt* and bears a revision assessment of Rs. 8-8-3 per acre. The field was green manured before transplantation, a crop of *san*-hemp (*Crotalaria Juncea*) being grown for the purpose. This was probably a better preparation for rice than a heavy application of manure, particularly if the green manure crop thrived well. The *san* crop necessarily required a considerable time to grow; therefore, the transplantation of the rice seedlings was delayed until August. The crop ripened early in December. Apparently the field was laid out for irrigation by forming long narrow beds, each the length or width of the field, water being directed into each bed in turn. The extent of irrigation is not reported, but the experimenter says that usually water is given every second day. This is not likely. The field grows groundnut, rice and sugarcane in rotation. The season is described as fair, and the cultivation indifferent. It is not stated whether the seed-bed was *rābed* or not, but 50 lbs. of seed on 4 gunthas furnished seedlings for an acre of transplantation. Less seed might have sufficed. The outturn is quite satisfactory and might fairly be valued at more than 8 annas, which is the figure adopted by the experimenter.

Outturn results are as under :—

		Anna Estimate	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
			Principal Product.	By-product.			
		As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
Experiment No. 62...	...	8	2,086	1,728	46 8 0	8 8 3	18·31

Mr. Thatte neglects the value of by-product; if added to the value of principal product the gross value of outturn would be considerably increased. The percentage incidence appears high, yet I feel sure the burden of assessment is

quite moderate. It is certainly so, if the supply of *pât* water is perennial. This appears probable. Otherwise, sugarcane would not be grown one year in three.

I must reject Mr. Thatte's sugarcane test. He exercised poor judgment in selecting his test area. It extended to $7\frac{1}{4}$ gunthas and was the remnant of a crop which covered 2 acres 12 gunthas of the field. The experimenter could not possibly know whether the test area was average for the field because the greater portion of the crop had already been harvested. The outturn results are poor. The value of *gul*, Rs. 131 per acre, would not certainly meet cost of cultivation, as the crop was liberally manured and otherwise well cultivated. The percentages of *gul* to juice and to cane are much under average. A reason for this no doubt existed, and could have been found out if proper enquiry had been made. The same variety of cane on an average under ordinary conditions yields twice the reported percentage of *gul*.

Mr. G. H. Hampton, Assistant Superintendent, Deccan Revenue Survey,

Submits five tests on sesamum and two on rice. The test areas of the former, with one exception are below the prescribed minimum. Four experiments were conducted on white *til* and one on red. Only one sample *ser* of each variety was forwarded to my office. The experimenter errs in supposing that all sample *ser*s of the same kind of grain must weigh the same. The weight will vary with the quality and dryness of the grain. I can only report two of the sesamum experiments, *viz.*, those in which the acre averages are deduced from actual weights of measured samples. These two experiments give the worst results, the outturn in each case being comparatively poor.

The first experiment (No. 63) refers to white *til*. The field has good *barad* soil but shallow and mixed with loose *murum*. It is irrigable by a *pât*. The assessment for soil and water combined is Rs. 5-13-4 per acre. The occupant intended to grow wheat as a second crop after the *til*, and the wheat crop would, of course, be benefited by irrigation, whereas the *til* was not, as it was wholly a rain crop. Therefore, the assessment chargeable against the *til* crop would only be a proportion of the soil rate, and that proportion would certainly be less than Re. 1 per acre. The field grew sugarcane in 1893, an indication that the *pât* supply of water is permanent in an average season. The field was liberally manured for the sugarcane, but no manure was applied for the sesamum, and probably none was needed. The cultivation is described as good. But a long drought in the middle of the season and heavy rain at the end were unfavourable for sesamum. The reported seed-rate, $4\frac{1}{2}$ lbs. per acre, is quite four times as much as was necessary if the seed was sound and carefully sown. The crop is said to have been sown in June and reaped in November. Usually *til* does not take nearly so long to ripen and generally is sown much later.

The red *til* experiment (No. 64) was taken on light *barad* soil assessed at Re. 0-10-0 per acre. The field grows *bajri*, linseed and *til*. In 1893 a rain crop of *bajri* was followed by a rabi crop of linseed. Probably I think because *bajri* was more or less a failure, as it was generally in that year. The season was unfavourable. The rainfall was not well distributed, and the young seedlings nearly withered during drought. The field was well tilled, but is never manured. The seed-rate, $2\frac{1}{2}$ lbs. per acre, is in this field also over average. The dates of seed time and harvest reported are about the same as in the other field.

The standard adopted in forming the anna estimates is not known. The experimenter retired from service before a reference could be sent.

The outturn, &c., results from each field are as under :—

	Anna Estimate.	Outturn of Seed per Acre.	Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
	As.	Lbs.	Rs. a. p.	Rs. a. p.	
First field (Exp. No. 63)	10—12	275	14 13 6	5 13 4	39.29
Fourth do. (Exp. No. 64)	12	108	5 1 8	0 10 0	12.24

I give below the reported results of the test, which for reasons given I cannot include in the tabulated statement:—

	Anna Estimate.	Outturn of Seed per Acre.	Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.	Remarks.
	As.	Lbs.	Rs. a. p.	Rs. a. p.		
Second field ...	10—12	355	19 2 3	6 12 11	35.56	White <i>til</i> to be followed by wheat. Sugarcane in the previous year. Assessment for soil and <i>pad</i> water. <i>Til</i> got no benefit from water.
Third do. ...	10—12	587	31 10 3	6 0 0	18.95	Do. do.
Fifth do. ...	12	326	17 9 3	0 11 0	3.91	Same crop to be followed by wheat or gram. Sugarcane in the previous year. Field irrigable from Irrigation Department channel; water paid for when taken.

Probably the assessment for soil in each of the above fields does not vary much, being probably less than Re. 1 per acre in each case. The soil of each field is light, free working and reddish, that of the second field being deepest and best.

This officer's rice experiments (Nos. 65 and 66) were conducted in the same village and on almost similarly classed land. The respective rates for soil and water are Rs. 7-0-5 and Rs. 7-0-3 per acre. Both fields are low-lying. The soil in each field is of like consistence and colour, but that in the second field is reported deepest and best. *Kamod* rice was grown in each field. This fine variety needs much water. The fields are irrigated by channel from a *bandhara* and the season is described as excellent, as there was an ample supply of water above the *bandhara*. Both fields grow rice, sugarcane, *til* and *bajri*, the two last followed by a second crop in the same year of wheat or gram. In neither field is there any fixed rotation. Neither crop was directly manured. It is not reported what crop preceded the rice in the first field, but in the second field sugarcane was grown in 1893, and the residue of manure from that crop no doubt benefited the rice. The crop in the first field had gone to straw more than grain and was lodged. It was grown from broadcasted seed. The seed-rate, 24 lbs. per acre, for a broadcasted crop, appears small. The crop of the second field was grown from transplanted seedlings. *Til* had been sown but failed in this field and the occupant bought rice seedlings to replace the *til* which had been ploughed up.

The outturn, &c., results are as under:—

	Anna Estimate.	Outturn of Grain per Acre.	Value of Outturn per Acre.	Assessment per Acre.	Percentage Incidence of Assessment.
	As.	Lbs.	Rs. a. p.	Rs. a. p.	
First field (Exp. No. 65) ...	16	902	26 2 9	7 0 5	22.37
Second do. (Exp. No. 66) ...	16	1,523	43 5 9	7 0 3	13.47

The straw was left on the field to rot and act as manure for the following crop. Its value is neglected. The above results clearly show the advantage of growing rice from transplanted seedlings rather than from broadcasted seed. Coarse varieties may do fairly well if grown from broadcasted or drilled seed, but fine varieties like *Kamod* must be transplanted, or the results will be poor.

*Mr. Ichhárám Bhagvándas, Ag. Superintendent, L. R. and
Agriculture, C. D.,*

Reports four carefully conducted crop tests, two on linseed and two on gram.

The linseed fields (Exp. Nos. 67 and 68) had each *káli bhurat* soil, i. e., black tinged with yellow-brown. The respective assessments are Re. 1-5-0 and Re. 1-11-6 per acre. The higher assessed soil is denser and more retentive of moisture than the other, and grows cotton in rotation with sesamum, *ba'jri* and linseed. The lower assessed field grew *til* and *kulthi* in 1891, *sha'lu* or rabi *jowa'ri* in 1892, and kharif *jowa'ri* in 1893. Both fields were well ploughed during the monsoon season and liberally manured for the tested crops. Season in each case was favourable. The seed in each case was seasonably sown in October by a light drill, 9 and 8½ lbs. per acre being the respective seed-rates. Each crop was harvested on the 8th February.

The outturn results are as under :—

	Anna Estimate.	Outturn per Acre.	Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.	Remarks.
	As.	Lbs.	Rs. a. p.	Rs. a. p.		
First field (Exp. No. 67).	16	207	12 8 5	1 5 0	10.47	Manured with 10 cart-loads per acre.
Second do. (Exp. No. 68).	20	297	17 14 8	1 11 6	9.59	Do. 20 carts.

The gram crops tested (Exp. Nos. 69 and 70) by this officer yielded poorly. The fields have each *káli bhurat* soil. They are, however, rated at a higher rate than the linseed fields, the respective assessments being Re. 1-13-8 and Re. 1-14-2 per acre. In each field gram was a second crop after *ba'jri*, occupying the whole of the first field but only a portion of the second. Second crops have not been grown on either field during the last four years. The late rains were favourable and this presumably induced the cultivators to sow gram. The first field during the last four years has grown cotton, *jowa'ri*, *ba'jri* and linseed. The second field during the same period has grown one crop of cotton and *ba'jri*, with and also without subordinate pulses in the other years. The gram was not directly manured in either field, but the previous *ba'jri* rain crops were each liberally manured with respectively 19 and 20 cart-loads per acre of Málegaon municipal manure. The seed was in each case sown by hand in October in the furrow behind a plough. The respective rates are 59 and 64 lbs. per acre. I think the anna estimates in the gram tests especially and perhaps also in the linseed tests are pitched too high.

The outturn results are as under :—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		Principal Product.	By-product.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
First field (Exp. No. 69).	14	215	150	6 13 2	1 13 8	27.17
Second do. (Exp. No. 70).	16	175	150	5 10 0	1 14 2	33.51

Mr. Ichhárám refers at considerable length to some local usages which are of general interest. I will summarize part of his report and give the following *in extenso* :—

"In Málegaon the seed for sowing is usually obtained from a *Váni* money-lender on what is called the *vádhi didhi* system, that is, the seed is to be repaid in kind at harvest at one and a-half times the quantity given. In the case of cotton the practice is that for one *palla* (120 weight *sers*) of seed supplied, the cultivator is to repay it in kind at harvest by giving one maund of seed-cotton. A maund of seed-cotton (lint and seed) is ordinarily equal to forty weight *sers*, but the *Váni* money-lender takes it at 44 *sers* for this repayment. The price of seed-cotton is this year exceedingly low, only Rs. 5 per maund of forty weight *sers*, and the difference of value of seed obtained and seed-cotton repaid is not material. With the price of seed-cotton at the rates of previous years, *viz.* Rs. 7 or Rs. 8 per maund, the difference would be considerable.

"When a cultivator is in need of money during the rains for cultivation and household purposes, the *Váni* money-lender as a rule declines to lend it on interest. But the usual practice is that he gives a loan, say of Rs. 20 to Rs. 50 or more according to requirements, on what is locally called the *jalap* system. Under *jalap* a condition is made that the loan should be repaid in kind at the next harvest, the quantity of produce given representing the value of the loan at certain prices which are fixed at the time of giving the loan and which are considerably lower than the ruling prices. Thus, for instance, the owner of Survey No. 92 under experiment obtained a loan of Rs. 60 on *jalap* about *Diváli* (October) for reaping *bájri*, cotton, &c., on condition that he should repay it in kind by supplying linseed at harvest at Rs. 9 per 63 measure *sers* (200 lbs.). Linseed fetched on the date of experiment Rs. 12 per 63 measure *sers* (200 lbs.). The former is an exceedingly cheap rate and the latter about an average rate. The *Váni* gained a considerable advantage inasmuch as the risk of linseed being cheaper than 200 lbs. per Rs. 12 was not great. The actual advantage was a return of the money advanced and 80 per cent interest for five months. This practice of obtaining loans on the *jalap* system as described above must obviously be ruinous to cultivators by seriously crippling the profits of husbandry and of their hard labour, and deserves careful consideration in connection with the important question of agricultural indebtedness which is now being ventilated all over India.

"The owner of Survey No. 48 under experiment got his land by purchase from another cultivator, about two years ago. He paid a sum of Rs. 700 in cash for two fields containing in the aggregate 19 acres 12 gunthas of dry-crop land assessed at Rs. 36-12-0 as shown in the margin. The purchase price is nearly twenty times the assessment and as the land is purely dry-crop land its value could not have been much enhanced by any improvements made by the old occupant."

A. G. Rs. a. p.	
Survey No. 48... 7 38 14 12 0 0	
(Pot. No. 1)	
Survey No. 58... 11 14 22 0 0	

Mr. Ichhárám reports that the season for crops other than cotton was fairly good. But for cotton it was exceedingly unfavourable, the reason being that the rain for sowing and for some time subsequently was very deficient. The crop being damaged past recovery in many fields was uprooted to make room for *bájri* and other crops which could be sown seasonably later. Moreover, even in the fields that were left the heavy rain of October was decidedly injurious, causing immature bolls to fall from the plants. Mr. Ichhárám reports that the cultivators believe that the prospects of the cotton crop greatly depend upon the dates of sowing. A 20-anna crop is expected when the seed is sown in *Böhini* (23rd May to 5th June), a 16-anna crop when sown in *Mrig* (6th to 19th June), and a 12-anna crop when sown in *Ardra* (20th June to 3rd July). There is no doubt a decided advantage in sowing early, because if germination is good the crop is almost sure to do well. But if the seed does not germinate well, no great harm is done because it is cheap and there is time to substitute another crop before the season is too far advanced. If sown late, cotton rarely succeeds, particularly on the lighter descriptions of soil because there is certain to be deficiency of moisture in the soil before the crop reaches maturity and rain late in October is always harmful, chiefly because it comes when the bolls of early sown crop are opening. The lint of the ripe bolls is thus discoloured and the immature bolls fall to the ground.

Mr. Ichhárám gives a local saying or proverb thus :—

"If rain falls in *Swáti* (22nd October to 3rd November) it will be difficult to get even cotton wicks for lamps, but this rain helps in producing pearls. The allusion to pearls refers to the common Hindu belief that the drops of *Swáti* rain when taken in by fish of the Bay of Mannar turn into pearls."

Ahmadnagar.

Experiments on *bájri* were ordered from this district. Mr. Brooke did not conduct any and no explanation has been given. Mr. Sorábji's tests have been omitted owing mainly to very poor results.

Mr. Sorábji Padamji, Assistant Collector,

Submits three *bájri* tests, which as a guide to the burden of assessment are of no value. *Bájri* was the principal crop of a mixture in each field. The

first field grew seven subordinate crops, the second four, and the third four. None of the subordinate crops were tested. The season for *bājri* was poor. Excessive rain spoiled the *bājri* at the flowering stage. The effect of rain on *bājri* at this time is to prevent fertilization as the stamens hang outside the efflorescence and their fertilizing power is certain to be destroyed by heavy rain. No other cultivated crop is affected in the same way, and probably the subordinate crops were less injuriously affected or they might not have been injured at all. The soil of each field is red soil of a light description overlying *murum*. It is not reported whether the subordinate crops promised well or otherwise.

The respective assessments and the values of *bājri* outturn from each field are shown as under :—

		Assessment per Acre.			Gross Value of Outturn per Acre.		
		Rs.	a.	p.	Rs.	a.	p.
First field	...	0	9	3	3	2	0
Second do.	...	0	9	1	3	8	0
Third do.	...	0	4	7	1	12	8

The results are not recorded in the tabulated statement.

The second and third fields are sublet, $\frac{2}{5}$ of the produce going to the owner and $\frac{3}{5}$ to the tenant; $\frac{2}{5}$ of the seed is found by the owner, who also pays the assessment. All other expenses are met by the tenant. The fields usually grow either *jowāri* with subordinate rows of safflower or *bājri* with subordinate pulses, oil-seeds and fibre plants. It is probably impossible to find a light soil field in the Ahmadnagar district in which there are no mixed minor crops. The minor as well as the principal crops should be tested if the test is intended to gauge the burden of assessment. The entries in Mr. Paḍamji's tabulated statement show that on the description of soil selected for experiment, *jowāri* with a single subordinate crop, safflower, is commonly grown. It would not be at all difficult to test *jowāri* and safflower in the same field as they ripen within a reasonably short time of each other. A test of this sort would have some value, whilst a test on one crop of a mixture in a year unfavourable to the tested crop has really no value.

Mr. V. B. Vādekār, District Deputy Collector,

Sends three tests (Exp. Nos. 71—73), all on *bājri*. I have some hesitation in reporting these tests, because (1) the test area in each case is below the prescribed minimum, being six gunthas instead of eight; and (2) because the anna valuations were made by comparing the crops with other crops in the same district and not with reference to previous crops on the same fields. The yields vary, because the fields differ in natural advantages. This is no reason why the anna estimates should differ. Other conditions being equal, the anna valuations should all be the same, and apparently should have been fixed about the average standard, because the experimenter reports the *bājri* crops of the district were about average.

Each crop had subordinate to it *tūr* and *ambādi*, apparently a sprinkling in each field, which did not promise to yield much. The subordinate crops were not tested, and this is another reason why the experiments are of no great value.

All the tests were taken on the same day. This was possible, because the selected fields were in close proximity. I judge of the proximity of the fields, because they were all in the same village, and the Survey Nos. are 30, 31 and 37. It is only an off-chance that three fields lying close together will fairly represent average crops on similarly classed land throughout a district, and unless an experimenter has special reasons he should select fields at considerable distances apart. Of course, there is less trouble in selecting fields close together.

The first field had red brown soil apparently of better quality than that of the other two fields, though of somewhat similar class. The rainfall was favourable throughout. All the fields were well ploughed and harrowed. Weeding was neglected in the third field, and this re-acted on the outturn—a circumstance which ought to affect the anna valuation. Each field was sown during the first

fortnight of July and reaped on 18th November. The seed-rate in each case was 8 lbs. per acre.

The outturn, &c., results are as under :—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		Principal Product.	By-product.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
First field (Exp. No. 71) ...	13	314	676	8 7 1	0 11 2	8.26
Second do. (Exp. No. 72) ...	11	198	415	5 6 4	0 7 0	8.10
Third do. (Exp. No. 73) ...	8	136	410	3 15 3	0 6 8	10.54

Poona.

The programme settled for this district was fully carried out, six experiments having been received on the crops selected.

Mr. Mollison, Superintendent of Farms, also conducted three tests on onions at Chakan in the Khed taluka.

Mr. H. W. J. Bagnell, Assistant Collector,

Reports one test each on rice, *nágli* and *bájrí*.

The rice (Exp. No. 74) was grown on rice *gadhi* land assessed at Rs. 2-0-3 per acre. The variety grown was *sál*, an inferior early ripening sort. The crop was raised from transplanted seedlings. It is not reported how the seed-bed was prepared. Cowdung was applied to it and also to a small portion of the field, but the greater portion of the field was unmanured. Presumably the test area was selected in the unmanured portion. The cultivation is described as indifferent, weeding being more or less neglected. The field is double cropped on an average one year in two, gram being the second crop when the late rains are favourable. The rainfall was ample and seasonable for the rice, and as the October rains were heavy probably gram followed the tested crop. The experimenter reports the average seed-rate as 64 lbs. per acre. This rate is high for a district of moderate rainfall. The grain is valued at a cheap rate, *viz.*, 64 lbs. per rupee.

The outturn results are as under. They are not bad for a carelessly cultivated unmanured crop :—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment
		Principal Product.	By-product.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
Experiment No. 74 ...	16	1,170	1,720	20 2 6	2 0 3	10.00

Nágli (Exp. No. 75) on *mál varkas* land assessed at Re. 0-6-2 per acre yielded well. The field is reported to lie fallow one year in five, but it is probable that the period of fallow is really longer. Since the field lay waste one crop of *tíl* (sesamum) and three consecutive crops of *nágli* have been taken, the crop experimented upon being the third. It is, I think, doubtful whether sesamum was really taken in the first year after fallow. It is more likely to have been niger-seed (*khurdsni* or *kála tíl*). That, at any rate, is the usual oil-seed grown on *varkas* land. The tested crop was grown from raised transplanted seedlings. The field was well ploughed before transplantation of seedlings, but was not manured. The rainfall was ample and seasonable. The reported seed-rate, 20 lbs. per acre, is much more than is necessary. The 20 lbs. are supposed to be equivalent to 10 *sers*, but 10 *sers* would be equivalent to 22 lbs. if the seed sown was of the same quality as that reaped, as a *ser* of the grain weighed 85 *tolas*.

The outturn results are as under :—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		Principal Product.	By-product.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
Experiment No. 75	16	942	1,025	19 14 4	0 6 2	1.93

The *bājri* crop tested (No. 76) by this officer grew on *khārvāt chopan* soil which requires a lot of rain to produce a full average crop. The field lay waste in 1892-93, and has not been ploughed since, the harrow only being used. A field which lay waste in 1892, and has not been ploughed since, must necessarily be well stocked with weeds. Therefore, although the cultivation is described as indifferent, it might probably be described as bad. *Bājri* followed *bājri* during the last two years, and no manure was applied to the tested crop. The season was favourable. The seed was sown early in August, and the crop reaped in November. The outturn estimated at 12 annas is better than the cultivator could reasonably have expected. The crop yielded 522 lbs. grain and 1,220 lbs. by-product per acre, together worth Rs. 15-15-7. The assessment is Re. 1-6-2 per acre and the incidence works out 8.67 per cent.

Mr. A. S. A. Westropp, Assistant Collector,

Reports three tests, one on *nāgli*, one on mixed *jowāri* and safflower, and one on gram. I cannot report the last. The acre averages are based upon a local *ser* measure of the pulse weighing 102 *tolas*, whilst the sample *ser* forwarded to my office weighed 124 *tolas*. This would cause an increase in the acre outturn of more than 20 per cent over the reported figures. The experimenter suggests that the increase may be due to absorption of moisture during damp weather, but the sample was weighed on the 23rd March, and no moisture could have been absorbed at the time.

The *nāgli* experiment (No. 77) was conducted on light coloured friable soil, *mulshi*, which slopes to a *nāla*, and is terraced at intervals with stone *tāls* probably to prevent surface wash. The tested crop was the second *nāgli* crop after the land lay fallow. The interval between fallows is irregular. The cultivator apparently allows the field to lie waste only as often as he is obliged to, *i. e.*, when the soil gets exhausted. The first *nāgli* crop after fallow was poor. That is the reason why two *nāgli* crops in succession were grown. No manure was used directly for the tested crop. It, however, was grown from seedlings raised in a rābed seed-bed. Cowdung and branchwood were used as rāb materials. The tillage was careful. There was sufficient rain at first, but not enough late in the season. The *nāgli* grain is reported to be exchanged in the district for onions and wheat—an indication that the parties to the exchange are in easy circumstances, the exchange being made obviously to increase the variety and improve the food available for home consumption.

The crop yielded 1,309 lbs. of grain per acre, which with the by-product was valued at Rs. 27-14-11. The revision assessment is Re. 0-7-0 per acre and the incidence only 1.56 per cent. The original assessment was Re. 0-4-7 per acre.

This officer's test (No. 78) on mixed *jowāri* and safflower gave rather poor results. In the eastern division of the Poona district the *jowāri* crop was below the average considerably, partly owing to failure of late rains and partly to cloudy weather. The crop in the district is generally sown late and partakes as much to the rabi season as to the kharif. The tested crop was sown in September. The field selected was reported to be the best land in the village. It grew a good crop in the previous year. This year the crop was uneven. Count was taken of this and an average got by selecting different test areas. Mr. Westropp thinks that the crop was slightly above the average of the season for the subdivision. The *kardai*, subordinate to the *jowāri*, was quite up to the average of

former years. Three consecutive rows of *kardai* alternated with twenty-one of *jowári*. The field has black soil which is, however, stony. No manure was applied. The tillage is described as careful. The crop, estimated as an 11-anna one, yielded 104 lbs. of *jowári* and 89 lbs. of *kardai* per acre, which with the by-product is valued at Rs. 7-0-11. The assessment is Re. 0-7-11 per acre and the percentage incidence works out 7.01.

Mr. J. W. Mollison, Superintendent of Farms,

Submits three tests on onions. The results indicate that the burden of assessment is very light.

The crop selected for the first test (Exp. No. 79) probably represented as good a crop as was grown in the village. The crops on many of the fields, however, were exceptionally good and showed evidence of the most careful cultivation. The cultivation of onions is rapidly extending in the Chákan, Khed, and Junnar circles, because of the failure of potatoes during the past four or five years owing to "ring" disease. The substitution of onions for potatoes will, I think, prove profitable to the cultivators. There ought to be no difficulty in finding a good market for the produce, because onions are largely consumed by the labouring population. Moreover, there is a considerable export trade from Bombay to Zanzibar, Japan, &c. At present only the choice pure white variety grown largely in the Násik district is exported. I think the cultivators in the Poona district would find it to their advantage to grow this variety instead of the coarser red variety commonly grown. In almost every field at Chákan and Khed there is a small mixture of the white variety with the red, and the former grow to as large a size as the latter. I have selected this year a number of bulbs of the white variety, also of a superior yellow variety, and on the Poona Farm will, in a year or two, be able to produce a quantity of pure seed of each of these varieties, which will be available for distribution.

The field has mixed black soil suitable for any irrigated crop, and specially suited for onions. The kharif season was unfavourable. Groundnut failed owing to heavy early rain, and *bájrí* which was subsequently sown was also a comparative failure, chiefly owing to heavy rain at harvest time. Generally groundnut is taken one year followed by *bájrí* and onions the next.

The field was twice ploughed and twice harrowed for the onions, and then ridged up with a two-bullock plough. Beds were formed by hand. The beds were flooded before the seedlings were transplanted, and seedlings were planted in the soft mud about three inches apart. The seed was broadcasted in the nursery beds in October, and the seedlings were ready for transplantation in December. 8.9 Chákan measure *seers* of seed were required for an acre of transplantation. The equivalent in lbs. is not known, but probably 15 to 17 lbs. per acre of transplantation were required. The nursery practically transplanted ten times its own area. It was flooded a few days before the seedlings were removed, so that the seedlings were lifted without damage to the roots. Half the length of the tops was clipped off as usual before transplantation. About a month after transplantation, the field was hand-weeded and the crop top-dressed with ordinary well rotted manure, the application being equal to about 17 large four bullock-carts per acre. The capacity of the carts is about 40 cubic feet. The crop was again hand-weeded about a month after manuring. It was watered from a well in the field three times a month for the first three months. There was no water in the well in April and for the last watering the owner brought water from wells about a mile distant. For this watering which was given a fortnight before the crop was harvested, seven *mots* worked for two days, and a great deal of water was lost by leakage, because the channel ran through fields which had cracked very much. This necessitated the employment of a number of men to prevent leakage as far as possible. The crop was ripe on the 5th of May. It consisted chiefly of red onions, but there were a few white and a few yellow ones. A sample of over 30 lbs. lost by dryage in 18 days about 11 per cent in weight. This is allowed for in the outturn figures. The loss is perhaps more than a cultivator would incur, because he hastens to sell the produce in order to get as large a weight as possible. The following is approximately the cost of cultivation, ordinary rates being charged for manual and bullock labour.

Area under onions—2,178.89 square yards.

	Rs.	a.	p.
Ploughing twice; 2 days with 6 bullocks, 1 man and 1 boy; bullocks Rs. 3; manual Re. 0-12-0 ...	3	12	0
Harrowing twice; 1 day with 4 bullocks and 1 man; bullocks Re. 1-0-0; manual Re. 0-4-0 ...	1	4	0
Ridging 1 day; 1 two-bullock plough; bullocks Re. 0-8-0; manual Re. 0-4-0 ...	0	12	0
Making beds; 4 men for 1 day ...	1	0	0
Preparing nursery seed-beds, inclusive of manure ...	3	0	0
Seed and sowing ...	2	10	0
Watering and weeding nursery seed-beds ...	2	8	0
First watering of field; 1 man and 4 bullocks at <i>mot</i> , 1 man repairing water channel and preventing leakage, and 1 man distributing water to beds for 2 days; bullocks Rs. 2-0-0; manual Re. 1-8-0.	3	8	0
Planting; 9 women for 2 days ...	2	4	0
First weeding ...	2	0	0
Second weeding ...	2	0	0
Eight cart-loads of manure, at Rs. 3 ...	24	0	0
Spreading do. ...	0	4	0
Nine waterings; 2 men and 4 bullocks for 1 day for each watering; bullocks Rs. 9-0-0; manual Rs. 4-8-0 ...	13	8	0
Last watering 7 <i>mots</i> ; 1 man and 4 bullocks for each <i>mot</i> and 22 extra men for 2 days; bullocks Rs. 14-0-0; manual Rs. 14-8-0 ...	28	8	0
Lifting ...	7	14	0
Total Rs. ...	98	12	0
Value of produce per Acre ...	235	0	0
Cost of cultivation per Acre ...	Rs. 219	a. 5	p. 6
Assessment per Acre ...	2	9	0
Total cost per Acre ...	221	14	6
Profit per Acre ...	13	1	6

It is certain that a good deal of the labour employed was household labour, and that extra labour was probably paid for in the usual give-and-take manner. In any case the cultivator has not only made a fair profit (which would have been larger if the cost of the last watering was not unusually high), but is credited with fair wages for himself, his family and the ordinary hire rates for his bullocks.

The soil of the field selected for the second test (Exp. No. 80) is lighter than that of the previous field tested, but is well adapted for irrigated crops. The whole number is *bágáyat* with an area of 3 acres 20 gunthas, all of which is commanded by a well. Ordinarily the water is insufficient to irrigate the whole area; consequently part of the number usually grows dry-crop only, whilst in the remaining portion groundnut, sugarcane, brinjals, chillies, and onions are rotated with each other.

The portion under onions grew *bájrí* as a rain crop. The *bájrí* was reported poor. In the previous year groundnut was grown. The field is owned by a minor and is cultivated by his uncle. The crop was poor compared with most of the other onion crops of the village and was selected for test to show the difference between a really good crop and a middling one. The inferiority was in part due to the shade of boundary trees. The crop near the headlands was consequently poorer than in the main portion of the field. The cultivation as described by the cultivator was almost identical with that of first test. There was no indication of carelessness. The water in the well was sufficient, and the crop was irrigated four times a month, the more frequent watering being necessary on account of the light character of the soil. If full wages for manual and bullock labour are charged, and if the manure applied to the crop is valued at Rs. 3-0-0 per cart-load (its actual value if bought), then I fear that the cost of cultivation will probably about only equal the value of the crop.* As already

explained in the first test, the labour was probably nearly all home labour, and the cultivator must have gained good wages for himself and family and ordinary hiring rates for his work cattle. The market rate for onions this year is higher than last year, but about equal to the average of the last five years. The out-turn figures in this test are reduced by about 11 per cent to allow for dryage. The loss is, I believe, the greatest that could occur, because the onions after losing 11 per cent moisture are as dry as if they had been stored for months. The actual loss to cultivators by dryage is so variable that I considered the loss by dryage as shown by one sample could safely be applied to each test.

The survey number in which the third test (Exp. No. 81) was taken is in part classed as dry-crop and in part as *bāgāyat*. The latter portion is irrigable from a well, also from a channel from a bunded stream. For this latter advantage it bears a special water-rate of Rs. 6, and for soil and water combined an assessment of Rs. 4-1-10 per acre. The test area, 3.5 gunthas, is less than the prescribed minimum. It contained an exact number of beds like the test areas of my other experiments, and was as large an area as the cultivator could harvest in a reasonable time with the labour at command.

The tested crop followed a rain crop of *bājri* which was reported poor owing to heavy rain at harvest time. In 1893-94 the field grew sugarcane, and in the previous year groundnut. This is a sequence of cropping which shows a due appreciation of the value of rotation. The tested crop was excellently cultivated, and the cultivator was well satisfied with the outturn. He would have watered the crop once more if the water in the well had not been low. Moreover, any water that remained was more urgently needed for sugarcane than for onions; therefore, the cultivator decided to lift the crop sooner than he otherwise would. The field has mixed black soil well suited for irrigated crops.

The following gives details of the cultivation, and its probable cost at ordinary rates:—

Area of Field—3,300 square yards.

	Rs.	a.	p.
Ploughing twice; 1st time with 10 bullocks for 2 days; 2nd time with 8 bullocks for 1½ days; bullocks Rs. 8; manual Re. 1-12-0	9	12	0
Clod-crushing by hand-implements, because field hard before ploughing and large clods turned up by plough.	1	0	0
Clod-crushing by heavy beam roller (<i>mēng</i>) used twice to smooth surface	1	4	0
Manure applied and spread; 12 cart-loads (7 cart-loads bought at Rs. 3 per cart-load) manure Rs. 36; spread- ing Re. 0-6-0	36	6	0
Harrowing twice	1	14	0
Cost of preparing seed-bed, 480 square yards (¼ of the above)	7	2	0
Cost of seed and sowing in October	3	14	0
Watering and weeding nursery seed-beds	3	8	0
Ridging with light plough	1	2	0
Transplanting in January; 4 bullocks, 1 man at the <i>mot</i> , 1 man distributing water, and 15 women transplanting for 2 days; bullocks Rs. 2; manual Rs. 4-12-0	6	12	0
Weeding three times; 1st a month after planting, 2nd and 3rd at intervals of a fortnight; 15 women for 2 days for each weeding	11	4	0
Watering 12 times; 4 bullocks and 2 men for 1½ days each time; bullocks Rs. 18; manual Rs. 9	27	0	0
Lifting, 85 women for 1 day	10	10	0
Total Rs.	121	8	0
Value of produce per Acre	228	0	7
Cost of cultivation per Acre	178	3	2
Assessment per Acre	4	1	10
Total cost per Acre	182	5	0
Profit per Acre	45	11	7

Sholapur.

Experiments on *bajri*, rice, gram, linseed and sesamum were directed to be made in this district. Two experiments on rice and gram each and one on linseed and groundnut have been reported. One of the rice tests and another on linseed have not been recorded for reasons given.

Mr. R. C. Brown, Assistant Collector,

Submits a rice test which is not satisfactory. The market rate at which the grain in husk is valued, 5 *ser's* or 13 lbs. 18 *tolas* per rupee, is three or four times higher than it ought to be. Again the straw is valued at an exceedingly cheap rate, 1 anna for 134 bundles. The weight of a local *ser* of the grain is not reported. The calculations are based on a *ser* weighing 105 *tolas*; whereas the sample forwarded to my office weighed 109½ *tolas*. The experimenter left his Sholapur charge before a reference was sent, and he was unable to make clear the points at issue. The experiment is not reported.

Mr. B. C. H. C. Kennedy, Assistant Collector,

Reports three experiments, one each on gram, linseed and groundnut.

The linseed test I cannot report. The acre averages are based upon a local *ser* of oilseed weighing 133½ *tolas*, whereas the sample sent to my office weighed only 123½ *tolas*. The experimenter cannot explain the difference, but says "I am afraid the *javas* was not quite dry." There is a still greater difference between the reported weight of the sample *ser* of groundnut and the weight found in my office. The weights are respectively 129 and 117 *tolas*. These weights are for kernels. The outturn was measured and weighed in husk. The report shows that this was carefully done and I think the probability is that the reported weight of unhusked nuts is right, whilst that of kernels is wrong.

The groundnut test (No. 82) is in other respects not quite satisfactory. The outturn is poor for a well manured irrigated crop and this appears to be partly due to careless cultivation, the crop being badly overgrown with weeds. The field slopes gently to a *nala* and has mixed brown soil, assessed at Re. 1-7-11 per acre. Thirty loads of farmyard manure per acre were applied for the groundnut. The preparatory tillage appears to have been careful. The seed was drilled in July and the crop harvested in February. The seed-rate, 106 lbs. per acre, is much over average. The season is described as unfavourable owing to deficiency of rainfall, particularly in October-November. But as the crop was regularly watered from a well the character of the season could not have affected the outturn very much. The experimenter says that the crop was 'harrowed up' and gathered. Probably a plough was used, but even with a plough many of the nuts are not at once exposed at the surface, and are not all gathered even when the field is gone over two or three times. Hand digging is the best method of lifting the crop and should certainly have been resorted to in the test area.

Mr. Kennedy on enquiry finds that the cash expenses incurred exceed the value of the crop, leaving out of count the labour of the *Khatedar*. This may be admitted. But if the crop had been an average one the results would have been different.

The outturn results are as under :—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn per Acre.	Assessment per Acre.	Percentage Incidence of Assessment.
		Principal Product (nuts in shell).	By-product.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
Experiment No. 82 ...	11	2,358	2,000	66 1 11	1 7 11	2.27

The field grew during the three previous years (1) maize, (2) onions, and (3) spelt wheat.

The gram tested (No. 83) by Mr. Kennedy gave a poor outturn. It was the sole crop of the year. *Jowári* is grown in two consecutive years and gram in the third year. The field has medium black soil assessed at Re. 1-0-11 per acre. No manure was applied and the cultivation was bad, the field being overgrown with weeds. Season was unfavourable and the outturn, though poor, is under-estimated at 8 annas. The gross value of outturn is only Rs. 6-9-4 per acre.

Mr. G. Scott, District Deputy Collector,

Reports a test on rice and another on gram.

The rice (Exp. No. 84) was grown on ordinary dry-crop soil, rain water being held by a *tál* newly constructed. The soil is blackish brown locally known as *marul*. The assessment is Re. 0-14-8 per acre. The rotation is reported as undefined. The experimenter ought to have given the sequence of crops during the previous three years as noted in Village Form No. III. The field was liberally manured with ordinary manure, 48 cart-loads per acre having been applied. The variety of rice grown was *sál*—a coarse early ripening variety. The season was average and the tillage good. The results are comparatively poor, but they are as good as could reasonably be expected; because the crop was drilled and the field is not properly embanked to hold water. An outturn of 760 lbs. of grain and 2,017 lbs. of straw, worth Rs. 19-15-6, classed the crop as a 12-anna one. But how the anna estimate is arrived at is not clear, as rice was apparently grown in the field for the first time.

This officer's gram test (No. 85) gave decidedly better results. It, however, only occupied 8 gunthas in a field measuring 8 acres 13 gunthas, most of which is classed as *bágáyat*. The gram occupied part of the *bágáyat* portion, the assessment of which is only Rs. 0-15-5 per acre. The field is irrigable from a well constructed before revision settlement. In the area tested wheat is usually a second crop after maize. This year gram was the sole crop. The other crops grown in the *bágáyat* portion this year were fodder *jowári* (*hundi*), maize, chillies and castors. The gram area was directly manured at the rate of 30 loads per acre of ordinary manure. Cultivation was good and season average. The experimenter says "the gram was irrigated only twice within one month. There was no necessity afterwards for irrigation, as there was sufficient rainfall." This statement can hardly be correct. The gram was sown in October, and it is most likely that it required the irrigation water as usual as it approached maturity. The seed was drilled. The seed-rate, 75 lbs. per acre, is decidedly high. The crop ripened in February and yielded 1,131 lbs. of pulse per acre, which at the cheap-rate of 45½ lbs. per rupee comes to Rs. 25. The value of the by-product is neglected. Gram chaff is all the same an excellent fodder. The percentage incidence is only 3-85.

Sa'ta'ra.

Messrs. Rand and Arthur carried out three tests each, and Mr. Cursetji two. The last named officer explains that he could not do the *bájrí* test required of him as he was at the time engaged on special duty.

Mr. W. C. Rand, Assistant Collector,

Reports two tests on gram and one on spelt wheat. All were second crops.

The gram fields (Exp. Nos. 86 and 87) have each black soil and are respectively assessed at Rs. 3-1-2 and Rs. 3-8-0 per acre. Each field grows *bájrí* and *shálu jowári* in alternate years, the *bájrí* being invariably followed by gram. No second crop is taken after *shálu jowári* as it is itself practically a late crop and belongs as much to the rabi as to the kharif season. The monsoon rainfall was deficient and the gram crops naturally suffered. The *bájrí* crop in each field was lightly manured, but no manure was applied directly for the gram. The seed-rates, namely 83 and 103 lbs. per acre, are much over average. The experimenter was aware of this, but had to accept the statements of the cultivators.

The outturns, &c., are as under :—

	Anna Estimate.	Outturn of Pulse per Acre.	Value of Outturn per Acre.	Assessment per Acre.	Percentage Incidence of Assessment.
	As.	Lbs.	Rs. a. p.	Rs. a. p.	
First field (Exp. No. 86)...	14	264	7 6 3	3 1 2	41.57
Second do. (Exp. No. 87)...	15	392	11 4 10	3 8 0	30.97

The value of by-product is neglected. The reported seed-rates are respectively about $\frac{1}{3}$ and $\frac{1}{4}$ the outturn.

If these figures are correct, and if the cost of tillage be added to the cost of seed, I doubt if the gross value of outturn in the first test will do much more than meet expenses. As regards the second field, it is clear from the experimenter's report that in an ordinary year the burden of assessment is not too heavy. The area experimented upon is Inám land. The Inámdár has let two acres to a tenant of long standing, who pays at the rate of Rs. 5-5-0 per acre, the Government assessment being Rs. 3-8-0. The tenant is a woman. This year the land was let by the tenant to a yearly sub-tenant. The terms were—the tenant to provide $\frac{3}{4}$ manure, $\frac{3}{4}$ seed, $\frac{3}{4}$ hired labour, and take $\frac{3}{4}$ gross produce. Sub-tenant to provide work cattle and tools and implements, and pay for $\frac{1}{4}$ seed, $\frac{1}{4}$ manure and $\frac{1}{4}$ hired labour, and take $\frac{1}{4}$ gross produce.

Khapli wheat (Exp. No. 88) was the subject of the third test. There were not many fields to select from as some were reaped and some were not ripe. The experimenter believes that the tested crop was rather above the average of the village. The reported seed-rate, viz. 170 lbs. per acre, is very high. The occupants are of the Máli caste. The number is partly classed as *bágáyat* and partly as *jiráyat*, and is irrigable from a *pát* which is not always to be depended upon. The water failed in 1892-93, and spelt wheat which had been sown had to be ploughed up and gram sown instead. The experimenter finds that the *jiráyat* as well as the *bágáyat* portion of the number grows garden crops, and he is making enquiries as to how the apparent mistake in classification came to be made. The assessment, soil and water combined, on the whole number, is Rs. 8-4-0 per acre, whilst if the water-rate be charged against the *bágáyat* portion only, the acre rate is Rs. 10-13-11. The soil is blackish and locally called *kálvat*. The season was favourable, and *khapli* crops were quite up to the average of former years. No manure was applied directly, but the tested crop must have got some benefit from an application of $18\frac{2}{3}$ loads of ordinary manure per acre applied to the previous *bájri* crop. The principal kharif crops grown during the last three years were *rála* and maize mixed in 1892, groundnut in 1893, and *bájri* in 1894. In 1892 and 1894 there were second crops and also small areas under pepper and turmeric in the former year and under plantains, turmeric and onions in the latter year. The tested crop was sown by heavy drill at the end of October and reaped early in March.

The outturn results are as under :—

	Anna Estimate.	Outturn of Grain per Acre.	Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
	As.	Lbs.	Rs. a. p.	Rs. a. p.	
Experiment No. 88 ...	20	929	30 15 3	10 13 11	35.71

The by-products were neither weighed nor valued, and although the straw of spelt wheat is not used as fodder, it has some value, which if added would

somewhat enhance the gross value of outturn. Mr. Rand says "the assessment appears to me to be very high in proportion to the value of the outturn." He thinks that the *bájri* grown in the monsoon "was probably of considerably less value than the crop of *khapli*, and when full allowance is made for it the incidence of assessment is still heavy."

Mr. S. B. Arthur, Assistant Collector,

Submits one test each on *bájri*, rice and *nágli*.

The *bájri* crop (Exp. No. 89) was grown on light soil, *múl rdn*, assessed at Re. 0-7-8 per acre. On the area tested, *bájri* and *argad jowári* are taken in alternate years. The field, however, grows other crops. This year *bájri*, *jowári*, *nágli* and *sáva* each occupied different areas, and about $\frac{1}{3}$ th of the whole number lay waste for grass. The arable portion of the field is ploughed every year. It was twice ploughed for the *bájri* and manured by folding sheep. The harrow was worked several times during May and June. The seed was drilled at the end of June, and the crop ripened in November. Meantime it was twice weeded, probably with the bullock hoe. The tillage was decidedly careful, and the season is reported good. The outturn is only middling. The crop is classed as a 12-anna one. The yield is 299 lbs. grain and 452 lbs. by-product, together worth Rs. 11-6-6 per acre. The incidence works out 4-20 per cent.

The rice crop tested (Exp. No. 90) by this officer gave a poor outturn. This may fairly be attributed to the soil being salt, to the want of timely rain and to the crop being grown from drilled seed.

The field is assessed at Rs. 2-13-8 per acre and grows rice every year, and a second crop of gram in seasons of favourable late rainfall. The field was manured with about 11 cart-loads cowdung per acre. The manure is reported worth Rs. 2 a cart-load. This valuation for an out-district appears exceedingly high, and particularly so as the reported value of the manure exceeds the gross value of the crop. If the manure is valued at the ordinary market price, then the cultivator must have expected a much better outturn from the field than he got. The inference, therefore, is that the manure is valued far too high, or the anna estimate of the crop is much too high. There is probably considerable error in both estimates.

The reported seed-rate, 31 lbs. per acre, is much under average for a drilled crop. The seed was sown in June and the crop harvested in November.

The outturn, &c., results are as under :—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn per Acre.	Assessment per Acre.	Percentage Incidence of Assessment.
		Grain.	Straw.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
Experiment No. 90.	14	524	1,223	17 0 6	2 13 8	16-75

Nágli (Exp. No. 91) yielded well on light reddish soil. The crop was grown from transplanted seedlings. The field and seed-bed were manured with ordinary manure at the rate of approximately five carts per acre. Again the manure is valued at Rs. 2 per cart-load. Season and tillage are each described as good. The number extends to 4 acres 9 gunthas, of which 25 gunthas was in *nágli*, 2 gunthas in rice and the remainder apparently lay fallow for grass. The experimenter reports that the area under *nágli* grows *nágli* every year. The field was well ploughed before the rains, and after rain fell, was well prepared with the plough and the harrow. The seed-rate works out 27 lbs. per acre. This is an extravagantly high rate, and probably 4 or 5 times as much as was needed.

The outturn, &c., results are as under :—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn per Acre.	Assessment per Acre.	Percentage Incidence of Assessment.
		Grain.	Straw.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	.
Experiment No. 91.	12	1,513	2,653	32 8 3	0 9 6	1.80

If the area under *nāgli* is not allowed, periods of fallow, as is usual, it has probably better description of soil than the rest of the number. I think that there is no doubt that the anna estimate is not high enough. The by-product is valued at over Rs. 6 per acre, and as *nāgli* straw is very poor fodder, probably the gross value of outturn is thus enhanced more than it should be.

Mr. J. M. Cursetji, District Deputy Collector,

Submits two tests, one each on wheat and gram, which were well conducted and fully reported.

The first test (Exp. No. 92) is on dry-crop wheat grown on medium black soil, assessed at Re. 1-9-4 per acre. The soil cracks freely in the fair season. No manure is ever applied. Only rabi crops have been grown since 1890. Generally wheat and gram, each with a sprinkling of safflower, are grown on separate areas each year. Linseed took the place of gram one year, and in 1892 the field was wholly under wheat. The season for the tested crop was fair, the late rains being favourable. The field is ploughed every second year. The heavy harrow only was used this year. The crop was not weeded.

Thirty-three pounds per acre of seed drilled in September-October produced a 16-anna crop, which yielded 381 lbs. grain and 337 lbs. straw. The grain is valued at Rs. 11-10-6 per acre, but the value of the straw is neglected. The incidence of assessment works out 13.58 per cent. The full assessment is Rs. 17, but the Ināmdār pays *judi* to the extent of Rs. 3. The land is rented to a tenant on the following conditions; tenant gives half the gross produce and meets all expenses except $\frac{1}{2}$ cost of seed and sowing and $\frac{1}{2}$ cost of reaping, winowing and threshing.

This officer's report on his gram test (No. 93) furnishes information of interest. The field was wholly *jirāyat* until the introduction of the revision survey. A year afterwards the occupant dug a *budki* (a *kaccha* well by the bank of a *nāla*), and began to grow garden crops. The whole number extends to 13 acres 1 guntha.

In 1891 the crops were entirely *jirāyat*.

In 1892-93, with the assistance of irrigation, one acre groundnut was grown.

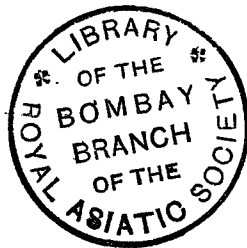
In 1893-94 the garden crops were—

					A. g.
Turmeric	...	...	...	...	0 5
Plantains	...	...	...	...	0 5
Sugarcane	...	...	...	...	0 20
Groundnut	...	...	...	...	1 0
Total	...	...	...	...	1 30

In 1894-95 the garden crops were—

					A. g.
Sugarcane	...	...	...	...	2 0
Chillies	...	...	...	...	0 20
Turmeric	...	...	...	...	0 20
Groundnut	...	...	...	...	1 0
Plantains	...	...	...	...	0 1
Total	...	...	...	...	4 1

How far the cultivation of garden crops in this holding will extend will depend upon whether the occupant can command a sufficient supply of manure, of water, and of labour. The soil is medium black, apparently suited for irrigation. The assessment is Re. 1-11-0 per acre. The gram gave only a middling outturn. The season was unfavourable, rain being scanty when most wanted. This statement hardly tallies with the character of the season as described for the wheat test in the same taluka. The cultivation is described as indifferent. No manure was applied. It was probably all needed for irrigated crops. The principal dry-crops grown in the field are *jowári*, wheat and gram. Double crops are not taken. The gram, which is estimated as an 11-anna crop, yielded 241 lbs. pulse and 256 lbs. useful by-product per acre, the gross value of which is Rs. 6-12-11. The incidence is 24.77 which looks high, but is apparently due to a poor crop.



SOUTHERN DIVISION.

Belgaum.

Each Assistant Collector was asked, as last year, to take two tests on *jowári* and one on *bájri*. Mr. Boyd followed the settled programme. Mr. Swifte sent in one test on *jowári* and another on wheat. Mr. Deshpánde was engaged on special duty during *bájri* harvest. He has submitted 5 valuable experiments on *jowári*.

Mr. Lushington, Superintendent, Land Records and Agriculture, failed to carry out any experiments owing partly to exigencies of tour and partly to heavy settlement duties.

*Mr. C. C. Boyd, Assistant Collector,**

Submits three tests, one on *bájri* and two on *jowári*. The Collector says "the incidence of assessment is advisedly pitched very low in these parts where the soil is poor and the rainfall fitful and uncertain. Only a good crop is harvested once in about 3 or 4 years. When the season is favourable the incidence is light, and when bad it becomes unduly heavy. The true incidence is obtained by striking the average of a series of years."

The *bájri* tested (Exp. No. 94) by Mr. Boyd grew on hard, red stony soil which grows *jowári* and *bájri* in alternate years. The assessment is Re. 0-2-1 per acre. The season was very fair: better in this and the surrounding villages than in the rest of the district. The field was lightly manured. It gets some manure every second year.

Jowári (Exp. No. 95) on similarly classed soil in the same village and bearing the same assessment yielded better than the *bájri*. The field was more liberally manured. Other conditions were much the same.

The respective outturn results are as under:—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.	Remarks.
		Principal Product.	By-product.				
		Lbs.	Lbs.				
Experiment No. 94.	15	454	555	12 8 11	0 2 1	1.03	<i>Bájri.</i>
Experiment No. 95.	18	664	810	19 14 5	0 2 1	0.65	<i>Jowári.</i>

The results of Mr. Boyd's 2nd *jowári* test (No. 96) show a striking contrast to the remarkable lightness of incidence as shown in the above figures. The experiment was conducted on rich deep black soil which is never manured, because (a) manure is scarce, and (b) the land bears good crops without it in favourable years. Mr. Boyd says the season was bad. Rain was scant at seed time, also in October when generally expected. "A very bad year in this part of the country, no good crops except in gardens." The field grows *jowári* continuously, kharif *jowári* one year, rabi *jowári* the next. The seed for the tested crop was drilled in September and harvest took place in January.

The results are as under:—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		Principal Product.	By-product.			
		Lbs.	Lbs.			
Experiment No. 96	5	126	590	8 3 6	1 4 9	15.77

The straw and chaff are valued at 110 lbs. and 256 lbs. per rupee—rates which could only rule in years of scarcity.

Mr. I. C. Swift, Assistant Collector,

Submits a test on wheat and another on *jowári*. The latter I cannot report. The acre averages are based upon a *ser* of grain weighing 80 *tolas*, whereas the weight found in my office was 64½ *tolas* only. On reference the experimenter says the sample was carefully kept in his office box from the 14th December to the 21st February, and attributes the difference to dryage. No grain, if ripe when reaped, could lose weight to the above extent, and the difference is certainly due to some other cause than dryage.

The wheat experiment (No. 97) was conducted on a black soil field which grows wheat, cotton and *jowári* in rotation. The season was somewhat unfavourable, and the crop suffered from want of moisture, also, it is reported, from the effect of west winds. The experimenter cannot see how a west wind could damage the crop any more than any other wind, and most people would be of the same mind. If clouds accompanied the west wind they certainly would be harmful. The tillage is described as good. The field was lightly manured with ordinary manure, 3 carts per acre. The wheat had subordinate rows of safflower which was not tested. The seed was drilled in October, and the wheat reaped towards the end of January. The seed-rate, 25 lbs. wheat and 2 lbs. safflower per acre, is somewhat under average.

Neglecting the safflower outturn (the crop occupied ½ of the whole area) and presuming that the wheat occupied the whole area, the outturn results are as under :—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		Principal Product.	By-product.			
		Lbs.		Rs. a. p.	Rs. a. p.	
Experiment No. 97	12	425	4 bundles	12 9 7	1 12 8	14.22.

Mr. N. G. Deshpande, District Deputy Collector,

This experimenter has taken two tests in each of two fields and a single test in a third field, all on *jowári*. The test areas have been selected with discrimination and as the results are obviously intended to show the effect upon the outturns of good rotation and manure, I will treat the tests taken in three separate numbers as five distinct experiments. They would have been of much greater value if the tested crops had not subordinate mixtures. The mixtures varied between fields, and none were tested. The subordinate crops may have been of considerably more value in one field or one portion of a field than in another. The seed-rates vary considerably, and this is another factor which vitiates strict comparison. The *jowári* seed-rate varies from 4 lbs. in the 3rd test to 25 lbs. in the 5th. The Collector says. "The experiments seem to have been carefully conducted and if the results can even be approximately trusted, the burden of assessment must be considered a very light one to bear."

The first two tests (Nos. 98 and 99) were taken on black soil, the third and fourth (Exp. Nos. 100 and 101) on good red soil mixed with small stones, and the fifth (Exp. No. 102) on *mardi* land, *i. e.*, a thin layer of black or red soil overlying *murum*. Season was favourable and tillage good throughout.

In the first field the areas selected for test belonged to two different occupants, grew different crops last year, and were this year sown at different seed-rates with different varieties of *jowári* and were otherwise differently treated.

The results from the various tests are as under :—

	Seed-rate per Acre.	Anna Esti- mate.	OUTTURN PER ACRE.		Value of Outturn.	Assess- ment per Acre.	Per- centage Incid- ence of Assess- ment.	Remarks.
			Princi- pal Pro- duct.	By- pro- duct.				
	Sers.	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.		
First field (Exp. No. 98) ...	3½ (Jowdri). 3½ (Tur).	20	1,316	4,024	44 15 11	1 15 3	4.34	<i>Khab-Shedgār</i> variety of <i>jowdri</i> sown. Every sixth row mixed <i>jowdri</i> and <i>tur</i> . Field manured with six loads manure and by folding sheep. Previous crop cotton.
Do. (Exp. No. 99)...	6 (Jowdri). 6 (Tur).	20	1,486	3,092	47 9 6	1 15 3	4.10	<i>Gidgidgemp</i> variety of <i>jowdri</i> sown. Every fourth row mixed <i>jowdri</i> and <i>tur</i> . Field manured with 16 cart-loads manure. Previous crop chillies which was heavily manured.
Second field (Exp. No. 100).	2 (Jowdri). 1 (Kulthi).	20	556	796	19 1 10	0 13 1	4.7	Variety of <i>jowdri Gund</i> . Every 4th row mixed <i>jowdri</i> and <i>kulthi</i> . Field manured with 4 loads manure per acre. Previous crop <i>jowdri</i> .
Do. (Exp. No. 101).	4 (Jowdri). ½ (Tur).	20	819	1,072	26 12 9	0 13 1	3.05	Variety of <i>jowdri Shedgār</i> . <i>Jowdri</i> and <i>tur</i> were mixed together before sowing. No manure this year but last year well manured for chillies.
Third field (Exp. No. 102).	12 (Jowdri). 6 (Tur). 5 (Kulthi).	20	244	588	9 1 7	0 8 3	5.66	Variety of <i>jowdri Gund</i> . Every fourth row sown mixed with <i>tur</i> and <i>kulthi</i> . No manure applied this year or last. Previous crop <i>rāla</i> and <i>bājri</i> mixed. Seed-rate much higher than necessary.

The results tabulated above clearly indicate the value of good rotation and unmistakably show the value of manure. They also show that *jowdri* does not do so well after a cereal as after crops of another family and that it does better after chillies than after cotton, the probable reason being that chillies to succeed must be liberally manured and leave a residue in the soil. If we leave out of count the seed rate of the last test, which is certainly higher than it ought to be, the other tests show that the better the condition of the field the higher the seed-rate allowed. The seed-rate may vary with the kinds grown.

Mr. Deshpande gives the following interesting account of the different varieties tested : “*Gund* (meaning round stone) is small round hard grain. It grows on inferior soils and does not require much moisture. *Shedgār* is a better kind of grain. It grows on good soft soils but does not require so much care and manure as *Gidgidgemp*. *Khab-shedgār* is a variety which differs from *Shedgār* in that the plant grows tall and straight, and contains more saccharine matter and is eaten by children like sugarcane. This particular quality gives it the distinguishing prefix *khab* which means sugarcane. *Gidgidgemp* is a plant of stunted growth but has a large grain which yields good soft flour. This variety is unsuited for inferior kinds of soil and yields larger quantities of grain than other varieties, and the grain is sold dearer than other varieties. *Gund* is always the cheapest variety.” Mr. Deshpande, however, values all varieties at the same rate in his tabulated statement of results.

Bija'pur.

Only four experiments have been reported from this district. Mr. Page sent in only one test on *bājri*. Subsequently he was absent on duty with a survey party. Mr. Chuckerbutty submitted no experiments because he was unable to find in his charge a *bājri* field without mixtures and the results of one test he did were open to the same objections that were raised against his experiment last year. The Collector thinks this explanation hardly satisfactory. Mr. Artāl conducted 3 tests required of him.

Mr. H. Page, Assistant Collector,

Submits one test (No. 103) on *bājri*. The *bājri* was a mixed crop; and every fifth row was sown alternately with *kulthi* and *tur*. The *bājri* thus occupied $\frac{1}{5}$ of the whole area; but as the subordinate crops were not tested the *bājri* acre averages are worked out assuming that this crop alone occupied the whole of the test area. It is not reported whether the subordinate crops promised to yield well or otherwise. The test is only of value as showing that the outturn from the principal crop alone in a moderate season is sufficient to make the burden of assessment very light. The field has black soil and grows chiefly *jowāri*, either late or early, and occasionally *bājri*. The tested crop was manured with approximately 3 loads of ordinary manure per acre. The tillage is described as good. The seed, about 4 lbs. per acre, was sown in July and the crop harvested in November.

Outturn results are as under :—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		Principal Product.	By-product.			
		Lbs.	Lbs.			
Experiment No. 103	8	331	436	6 12 4	0 3 1	2.84

Mr. R. C. Artāl, District Deputy Collector,

Submits two tests on *bājri* and one on *jowāri*.

The *bājri* tests (Nos. 104 and 105) were taken on light soil fields assessed respectively at Re. 0-2-0 and Re. 0-7-4 per acre. No manure is ever applied to either field; a considerable proportion of the first field usually lies waste for grass but occasionally the portion is brought under tillage. Only a small portion of the second field usually lies waste. In both fields the principal crops are late *jowāri* and *bājri*, each with subordinate mixtures. Generally a small area in each field grows chillies. Sesamum in the first field and Italian millet and tobacco in the second field are now and then grown to a small extent.

The tested crop in the first field had a mixture of *math* in every 6th row, while in the second field *tur* was similarly sown. In the latter there was an additional sprinkling of *mug* and *ambādi*. The subordinate mixtures are estimated in each field to have covered $\frac{1}{11}$ th of the areas experimented upon, but they were not tested. It is not reported whether they promised to yield well or otherwise. The acre averages are calculated assuming that *bājri* alone occupied the test areas.

The first field was not ploughed but was well prepared with the harrow and the crop was bullock-hoed thrice. The second field was twice ploughed and well prepared with the harrow before sowing. Subsequently the crop was twice bullock-hoed and once hand-weeded. Sowing was later than usual owing to scant early rainfall. After sowing rain was sufficient and timely, and the season was good. The reported seed-rates are in each field the same, *viz.* 4½ lbs. per acre. The fields were sown towards the end of July and the crops ripened in the middle of November.

Outturn, &c., results are as under :—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		Principal Product.	By-product.			
		Lbs.	Lbs.			
Experiment No. 104	16	426	996	9 7 3	0 2 0	1.32
Experiment No. 105	16	519	1,081	11 7 9	0 7 4	3.99

The burden of assessment is decidedly low. . . .

The *jowári* tested (No. 106) by this officer grew on a black soil field which is assessed at Re. 0-15-3 per acre. The principal crops grown are cotton, late *jowári*, wheat and linseed, and these are more or less rotated with each other. Generally safflower is a subordinate crop with *jowári*, but this year the *jowári* was sown alone. The season was fairly good. Late rains were rather scant and as the crop was sown in September and reaped in February it suffered to some extent from lack of moisture. Manure was last given four years ago. About 6 cart-loads per acre were then applied. The preparatory tillage for the tested crop was only fair. The harrow only was used, and although the bullock hoe was worked four times to keep down weeds yet the whole area was covered with *hariáli* grass. The reported seed-rate, viz. $3\frac{1}{2}$ lbs. per acre, is under average.

Outturn results are as under :—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		Principal Product.	By-product.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
Experiment No. 106 ...	14	681	1,701	15 8 0	0 15 3	6.14

Dha'rwa'r.

Experiments on sesamum, *bájrí*, *rági*, linseed and gram were arranged for in this district. Mr. Knight sent in one test on *rági* and another on safflower. He had arranged for a linseed test, but owing to short rainfall the crop was harvested earlier than usual and on his arrival he found safflower the only standing crop in the locality and so chose it. Mr. Anderson could not find a *bájrí* field in his charge suitable for test. He therefore experimented on *navani*. Later on he went on duty with a survey party. Mr. Bhángáonkar submitted tests on *rági*, gram and linseed.

Mr. Swifte's experiment on *rági* which was received too late for inclusion in last year's report has been reviewed in the present report.

Mr. R. Knight, Assistant Collector,

Submits one test each on *nagli* and safflower.

The *nagli* (Exp. No. 107) had subordinate to it *tur* which occupied every ninth row. The *tur* was not tested. The crop selected for experiment was over average for the district. It is assessed at 12 annas, whilst the experimenter reports that the average for such crops in the neighbourhood was only 6 to 8 annas. The season was unfavourable owing to inadequate rainfall. No manure was applied since 1892, and then the dressing applied was very light. The field has red *masari* soil. There is no definite rotation. *Jowári* occupied the whole field in 1893, and *nagli*, *sava*, *tur* and *kulthi* were the crops taken in 1894. In the latter year one-fourth of the field lay waste. Irrespective of the *tur* the tested crop yielded 966 lbs. grain and 935 lbs. by-product per acre, together worth Rs. 13-13-0. This for a drilled crop in an unfavourable year must be considered a satisfactory outturn. The percentage incidence is only 6.68.

This officer's test on safflower is of no value and is not reported. The safflower was a row crop with wheat and only occupied every ninth row. The anna estimate is 4 annas. The season was very poor for safflower. The actual outturn from an acre was only 31 lbs. worth Re. 0-11-10, the yield of wheat being an unknown quantity.

Mr. L. C. Swifte, Assistant Collector.

This officer's test on *nagli* (Exp. No. 108) was submitted too late to be included in last year's report. The *nagli* had *jowári* subordinate to it. The latter crop was not tested. It occupied every fifth row. The acre averages are calculated on the assumption that *nagli* occupied the whole of the test area.

The field has red *masari* land assessed at Re. 0-12-5 per acre. A fairly liberal dressing of ordinary manure, 12 loads per acre, was applied. Season and tillage were both good. The crop yielded well and is under-estimated, I think, at 10 annas.

The outturn, &c., results are as under :—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		Principal Product.	By-product.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
Experiment No. 108 ...	10	815	1,474	13 12 0	0 12 5	5.64

Mr. F. G. H. Anderson, Assistant Collector,

Submits one test (No. 109) on Italian millet. This crop was more extensively cultivated than usual owing to the rainfall being scant and not well distributed. A season of light rainfall suits *navani* better than *jowari*. The former crop is of rapid habit of growth. It may be sown with advantage late if early rains are scant. On the other hand if sown early it gives a supply of fodder and grain sooner than almost any other grain crop. The field selected for experiment occupies a slope and has good red soil. The experimenter saw better *navani* crops on similar land, but generally the crops on black soil were not so good. The field was fairly manured, about 9 loads per acre of ordinary manure being applied. The seed was drilled in August at the rate of $6\frac{1}{2}$ lbs. per acre through a single tube fixed behind a plough and was thus dropped into every furrow made by the plough and covered by the soil moved in making the next furrow. The crop ripened in $3\frac{1}{2}$ months and yielded 843 lbs. grain and 2,631 lbs. of by-product worth together Rs. 11-13-0 per acre. Both principal and by-products are valued at a cheap rate; the former being valued at $79\frac{1}{2}$ and the latter at over 2,000 lbs. per rupee. In a year of scarcity both grain and by-product would have a considerably higher value for home consumption. The field grows *jowari* with subordinate mixtures, cotton and *navani*, but no definite rotation is practised. The crop grown depends upon the character of the season. The field is assessed at Re. 0-8-8 per acre and the incidence works out 4.58 per cent. The field under experiment had been the year before hand-dug at a reported cost of Rs. 20-6-0 per acre to clear it of the *nattu* weeds. The benefit is presumed to last 10 to 14 years. There is considerable doubt as to the accuracy of the reported figures. The sample forwarded to my office weighed 146 *tolas* against a reported weight of 170 *tolas*. The experimenter on reference says that the 24 *tolas* may have been lost during transit or eaten by vermin. He further says the results are not affected, as his calculations are based on measured quantities and not on weights: but if the grain was not properly dry when measured, the measured quantities must be necessarily wrong. I report the test with some misgiving.

Mr. K. N. Bhángarkar, District Deputy Collector,

Submits three tests, one each on *nagli*, gram and linseed.

The *nagli* experiment (No. 110) was conducted on white *masari* soil which bears an assessment of Re. 0-12-10 per acre and grows *jowari* and *nagli* in alternate years. A portion of the field is manured with about 15 loads per acre of ordinary manure every year. The manuring of the whole field is completed in five years. The portion under experiment was last manured in 1893-94. The *nagli* was a drilled crop, the seed-rate being about 3 lbs. per acre. This could hardly have been sufficient. The seed was drilled towards the end of June and the crop ripened early in December. The season was unfavourable because there was a long break in the rains between August and the 15th of October. Tillage is described as good.

The outturn results are as under:—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		Principal Product.	By-product.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
Experiment No. 110 ...	10	1,023	181	19 4 11	0 12 10	4.15

The by-product was not weighed, but it was valued at Rs. 3-12-0 per acre.

The gram tested (No. 111) by this officer had subordinate rows of safflower. The latter crop occupied $\frac{1}{4}$ th of the area under experiment. It was, however, not tested. The acre averages are deduced on the assumption that gram alone occupied the test area. The field has black soil, which grows mostly cotton, wheat, *jowári* and gram. Manure was sparingly applied for the gram, less than 2 loads per acre being used. The rainfall was unseasonable and insufficient. The crop estimated at 8 annas yielded 242 lbs. pulse and 143 lbs. chaff per acre, together worth Rs. 7-10-7. The incidence of assessment works out 20.73 per cent.

Linseed was tested also on deep black soil which grows usually cotton, *jowári*, wheat, gram and linseed, rotated with each other but in no definite manner. The linseed was a subordinate crop, there being one row of linseed and one row of gram to 6 rows of *jowári*. Neither the gram nor the *jowári* were tested, and the actual outturn of linseed from an acre was 46½ lbs. worth Rs. 2-5-1. It might be argued that if the linseed occupied the whole of the field, its acre outturn would be eight times the above figure. But it would be very unsafe to gauge the burden of assessment by such data. The results are not included in the tabulated statement of results, because either set of figures would be entirely misleading.

Kola'ba.

Eight experiments in all have been reported by District Officers. Mr. Fawcett sent in three tests, and Mr. Brooke two on rabi pulses. Mr. Kánga could not do *rági* and *vari* tests, owing to *jamábandi* and other work, and so did all the three tests on gram.

Officers of the Konkan Revenue Survey carried out 6 experiments, all on rice in this district.

Mr. C. G. H. Fawcett, Assistant Collector,

Submits one test each on *nágli*, *vari* and niger seed. The test areas are in each case half of the prescribed minimum. The experimenter explains that he had no copy of the standing orders with him, hence the mistake made.

The *nágli* and *vari* tests (Nos. 112 and 113) were taken on the same *varkas* number. The crops were grown by different cultivators, who rent the patches under cultivation from the Bráhma owner at a rent of $\frac{1}{3}$ rd the gross produce in kind. The area of each test grows after two years' fallow *nágli* in the first year and *vari* in the second. Then the land is again allowed to lie waste. Excluding *pot kharab* the area of the whole number is 3 acres and 29 gunthas. The assessment is Re. 1 for the number or Re. 0-4-3 per acre. *Nágli* in several patches occupies 17 gunthas and *vari* 9½ gunthas. The rest is in grass. The experimenter values the grass at Rs. 12, and says, if it was exported to Bombay, it would be probably worth more; the field being near the railway and not subject to trespass by cattle. The grass is used as *ráb* material for the seed-beds of 6 acres of paddy fields and for this purpose is worth Rs. 12. Assuming that the other cultivated patches in the number yielded the same as the test areas of *nágli* and *vari*—

				Rs. a. p.
The Bráhma's rent from the tenants would be ...	...	...	...	5 1 0
Add—Value of grass ...	...	...	...	12 0 0
				17 1 0
Deduct—Assessment ...	...	...	...	1 0 0
Net profit this year ...	...	...	...	16 1 0

The patches of the number which are under cultivation have stony sloping shallow soil. Both *nagli* and *vari* were grown from transplanted seedlings. The seedlings were in each case grown on liberally rābed seed-beds. The rāb material used consisted of cowdung, earth and grass. The *nagli* required $5\frac{15}{17}$ gunthas seed-bed to an acre of transplantation, whilst *vari* required for a similar area a $2\frac{2}{15}$ gunthas seed-bed. The reported seed-rates are in each case far too high and cannot be accepted as at all accurate. The cultivation of both crops is described as indifferent, but in what respects is not clear. It might, I think, be more correctly described as ordinary. The season was good. The rainfall was sufficient and timely during the growing season; but when the crop was ready for harvest heavy rain lodged the crops and did some damage. The *nagli* was a first crop after fallow, the *vari* the second crop, *nagli* preceding it.

The outturn results are as under :—

		Anna Estimate.	Outturn of Grain per Acre.	Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		As.	Lbs.	Rs. a. p.	Rs. a. p.	
Experiment No. 112	...	16—18	1,384	26 12 4	0 4 3	0.99
Do. No. 113	...	16—18	974	15 9 2	0 4 3	1.70

The value of by-products is neglected in both tests. The straw and chaff of both *nagli* and *vari*, though comparatively worthless as fodder, ought to have a considerable value as rāb material, more particularly as the grass from the same holding is valued at a high rate for rāb purposes.

Niger seed (Exp. No. 114) on less stony *varkas* land assessed at Re. 0-5-4 per acre did not yield so well. The niger seed was the second crop taken since the land lay waste, *nagli* being the previous crop. Two years fallow alternates with two years of cropping. No manure was applied. The seed was broadcast about the middle of June. The seed-rate is, I think, considerably over-estimated at $13\frac{1}{2}$ lbs. per acre. The whole number measures 30 gunthas, of which 8 gunthas only are under tillage, the rest under grass. The cultivated patch is let to a tenant. The owner gets $\frac{1}{3}$ of the gross produce. The portion under grass is reported to be worth to the owner only about 12 annas as the number is near a road, and the grass is trampled down and eaten by trespassing cattle.

Outturn results are as under :—

		Anna Estimate.	Outturn of Grain per Acre.	Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		As.	Lbs.	Rs. a. p.	Rs. a. p.	
Experiment No. 114	...	16—18	204	9 6 0	0 5 4	3.55

Mr. H. O. W. G. Brooke, Assistant Collector,

Reports two tests, one on gram, the other on *val*, both second crops in rice fields. The outturn results are in each case quite satisfactory, and are, I think, under-estimated at 12 annas each.

The gram field (Exp No. 115) came into the present occupant's possession three years ago when he embanked it; and gram presumably as a second crop after rice has been grown each year since. The *val* field (Exp. No. 116) is owned by a tradesman and rented to a tenant-at-will for one-third gross produce as rent. The field grows rice every year and second crop in season of favourable late rainfall. The season for *val* was exceptionally good, but the gram was slightly damaged by late rain. The tillage of each field was ordinary. The seed in each case was sown broadcast after ploughing. The reported seed-

rates are for gram 70 to 80 lbs. per acre and for *val* 24 lbs. The former is over average, but a broadcasted crop needs more seed than a drilled crop. Neither crop was manured.

Outturn, &c., results are as under :—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.	Remarks.
		Principal Product.	By-product.				
		As. Lbs.	Lbs.				
Experiment No. 115 ...	12	827	.....	27 13 0	4 1 5	17.62	Gram.
Do. No. 116 ...	12	933	20 Baskets.	20 12 0	6 6 5	30.85	<i>Val</i> .

Mr. R. E. Kanga, District Deputy Collector,

Submits three tests (Nos. 117—119) on gram conducted on *rabi* fields, which are assessed respectively at Re. 0-15-3, Re. 0-13-5 and 14 annas per acre. The field bearing the least assessment was well manured by folding sheep. The others were not manured. The Collector in the forwarding letter notes that the manured field produced nearly 50 to 90 per cent more pulse than the two higher assessed unmanured fields. He adds: "Apparently with ordinary unmanured cultivation the assessment on an average crop is about $\frac{1}{10}$ th of the crop; with liberal sowing and good manuring the assessment can be reduced to about $\frac{1}{17}$ th." The first field grows gram every year. *Val* and gram are rotated in the second field, and *mug* and gram in the third. The season was good. The cultivation of the third field is described as fair, that of the others good. The seed was sown through a single tube fixed behind a plough. The seed thus falling into the furrow made by that implement and covered by soil moved in making the next furrow. The seed-rate would vary with the tilth of the field, more seed being required if the soil is rough than if friable and smooth. The reported seed-rates are respectively 80, 157 and 117 lbs. per acre. All are above average and the two last much above.

The outturn results are as under :—

	Anna Estimate.	Outturn of Pulse per Acre.	Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
	As. Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
First field (Exp. No. 117) ...	12	267	9 4 7	10 15 3	10.26
Second do. (Exp. No. 118) ...	16	397	13 9 1	0 13 5	6.18
Third do. (Exp. No. 119) ...	10	210	7 2 3	0 14 0	12.25

Mr. W. S. Cole, Assistant Settlement Officer, Konkan Revenue Survey,

Submits three tests on rice. The test areas are each only 2 gunthas or half the prescribed minimum. The experimenter says he had no copy of standing orders with him, hence this mistake. The crops were in each case grown from transplanted seedlings raised on raised seed-beds. No manure was used on the fields. The local information as to proportionate area of seed-bed to acre of transplantation and as to seed-rates was too conflicting and unreliable to record. The average seed-rate of the district for rice is reported as 20 to 30 lbs. per acre. A different variety of rice grew on each field: *Panvel* worth Rs. 26 per *khandi* of 20 maunds in the first field, *Ghosal* worth Rs. 28 per *khandi* in the second, and *Hartál* worth Rs. 25 per *khandi* in the third. The tillage of the second field is described as fair, that of the others good. Season was favourable. Each field grows rice every year, and no second crops are taken.

Outturn results are as under :—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		Principal Product.	By-product.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
First field (Exp. No. 120) ...	18	1,593	2,260	32 3 0	3 2 2	9.71
Second „ (Exp. No. 121) ...	18	2,100	5,420	49 9 4	3 12 9	7.67
Third „ (Exp. No. 122) ...	18	1,890	3,880	33 10 4	4 1 1	10.84

Mr. W. D. Wilkins, Assistant Superintendent, Konkan Revenue Survey,

This experimenter cut two patches from the same field and presents the results as two different tests. The results are reported as two distinct experiments, because one of the test areas was selected in the seed-bed which had been rābed and which when the seedlings were removed, was itself transplanted. The other test area was selected in the main portion of the field. The field was not manured, and Mr. Wilkins took no notes as to the method in which the seed-bed was rābed. The test is of interest as showing that rābing not only benefits the seedlings grown on the seed-bed but also leaves a manurial residue which benefits the crop subsequently grown from transplanted seedlings on the seed-bed. This is generally known to the rayats. The outturn from the seed-bed is usually more than from the rest of the field. Grain from the seed-bed is also usually superior in quality and is retained as seed for the following year. The season was somewhat unfavourable, and the tillage is described as good.

Outturn results are as under :—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.	Remarks.
		Principal Product.	By-product.				
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.		
Experiment No. 123 ...	14	2,147	2,256	47 13 10	7 13 6	16.38	Seed-bed area.
Do. No. 124 * ...	14	1,437	1,500	32 4 8	7 13 6	24.29	Field area.

The mean of these results cannot be taken as average for the field, because the seed-bed only was about $\frac{1}{4}$ th of the field.

Mr. J. A. McIver, Assistant Superintendent, Konkan Revenue Survey,

Submits one rice test. The field (Exp. No. 125) was cultivated by contract, by an old man, his wife, son and daughter-in-law. The area is $26\frac{3}{4}$ gunthas. The terms of contract are not reported. The assessment is Rs. 3-10-5 per acre. The experimenter says : “At the time of original survey the field was covered by salt water at time of spring tides and even now at very exceptional times the water covers it. But since original survey the embankments in other lands nearer the creek have been much enlarged and the value of the land improved.”

One maund of rice was borrowed as seed on the condition that two maunds would be returned at harvest time. The seed-bed was 3 gunthas in extent and was on highly lying *varkas* land. Fifty-four pounds of seed was sown on the 3 gunthas. The seed-bed was burnt with rāb material and produced sufficient seedlings for the field. But some of the seedlings were destroyed after transplantation by heavy rain, and the seed not sown in the seed-bed, eighteen pounds, was broadcasted by hand in the field. If such was the case the produce from the seed must have ripened later than that from the transplanted seedlings, and I fail to see how the crop could have been quite even as reported. Heavy late rain belated reaping, and perhaps the produce of the broadcasted seed had time to reach maturity.

Outturn results are as under :—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		Principal Product.	By-product.			
		As.	Lbs.	Rs. a. p.	Rs. a. p.	
Experiment No. 125 ...	16	2,079	3,056	44 3 7	3 10 5	8.2

Ratna'giri.

Mr. Crump was requested to take two experiments on rice and two on *til*. He could conduct none owing to his detention at head-quarters and then proceeding on leave. Mr. Kelkar was asked to do eight experiments on *varkas* crops in the Devgad taluka. He has submitted six careful and well reported tests.

Mr. V. R. Kelkar, District Deputy Collector,

Submits six experiments on *varkas* crops in the Devgad taluka. These were specially ordered by the Commissioner with a view to ascertain the fairness or otherwise of the survey assessment in certain Khoti villages, from which complaints of over-assessment had been received by Government. Mr. Ozanne has already submitted his report on these experiments and has shown that the burden of assessment on gross produce in well selected *varkas* lands, after making full allowance for years of fallow, is fairly moderate. I will report the results below without entering into the disputable question which has been gone into at considerable length by the experimenter, *viz.* whether the Khot is a loser or gainer by his transactions. They may briefly be summarised in the following table :—

	FULL PERIOD OF ROTATION.		Crop experimented upon.	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	PERCENTAGE INCIDENCE OF ASSESSMENT ON GROSS VALUE OF	
	Years of cropping.	Years of fallow.			Principal Product.	By-product.			Tested crop.	Crops raised during period of rotation, inclusive of years of fallow.
					Lbs.	Lbs.	Rs. a. p.	Rs. a. p.		
First field (Exp. No. 126)...	3	8	Sarvat rice.	5	254	506	5 14 1	0 2 0	4.25	12.21
Second do. (Do. No. 127)...	3	7	Barag ...	9	676	...	10 10 1	0 4 0	2.35	6.50
Third do. (Do. No. 128)...	3	4	Niger ...	6	169	...	5 7 10	0 8 0	9.10	11.12
Fourth do. (Do. No. 129)...	4	6	Rági ...	12	1,217	...	26 4 2	0 4 0	0.95	4.95
Fifth do. (Do. No. 130)...	4	8	Kodra ...	8	714	...	6 12 11	0 4 5	4.05	8.88
Sixth do. (Do. No. 131)...	2	20	Rági ...	12	1,120	...	26 1 10	0 2 0	0.47	6.23

The crop in the fourth field was liberally manured and otherwise well managed. That in the sixth field was the first crop taken after a long fallow and was moreover lightly manured. In both fields the outturn results are satisfactory; whilst in the other tests they range from fair to poor. The worst results are to some extent attributable to poor farming. The season was favourable. The experimenter's anna estimates are probably pitched too low.

The incidence of assessment as shown in column 10 is very moderate except in the first and third tests. In these latter the outturn is poor, and the poorness may be attributed to preventable causes. The figures in the last column are intended to show the incidence of the total assessment exigible during years of cropping and fallow on the gross value of produce obtained during the years of cropping. There are too many factors of uncertainty to make these figures quite trustworthy. No count is taken of the value of the land for grazing or for *ráb* during the years of fallow. Only one of the crops of the rotation has been tested in each holding, the probable outturn for the other crops of the rotation being only estimated. Nevertheless, the crops experimented on include most of the crops grown in the common rotations of the tract, and it might be argued that the yield of each of the crops of a rotation on a particular field might be

approximately estimated from the actual outturn obtained on other similarly assessed fields in the same locality. This would no doubt be the case if each holding was equally well or equally badly farmed, if the rotations of crops and periods of rotation and of fallow were in each holding the same, if the soils of the tested fields were of like character as to levelness and depth, and if there was no change in prices or in the character of the seasons during the whole period of rotation. The differences between all the tested fields in these respects are such that the outturn of a crop as found in one field cannot be made applicable to the others. Mr. Kelkar has done the best he could under the circumstances and on hearsay evidence has estimated the average outturn of other crops grown in rotation with the crop actually tested. His estimates may be taken as fairly approximate. They prove that the incidence of assessment on gross produce, allowing for years of fallow, is in no case high.

Sarvat or *sonphal* (red) rice (Exp. No. 126) was the first crop tested. It was grown on upland level *varkas* land with a layer of only 3 or 4 inches of earth over sheet-rock. The land is never manured. It grows *barag*, niger seed and rice or *harik* in succession after lying at rest for 8 years. Season was favourable. The low outturn is attributed to slight injury done by caterpillars and to careless cultivation. It is probably chiefly due to the land being more or less exhausted, this crop being the last of the customary rotation. The following table gives the value of the average outturn obtained from this field as estimated by the experimenter :—

Crop.	Value of Outturn per Acre.	Assessment per Acre.	Average Incidence of Assessment.	Remarks.
	Rs. a. p.	Rs. a. p.	Per cent.	
Barag (first crop)	10 10 1	0 4 0	...	Estimate.
Niger (second crop)	6 0 0	0 4 0	...	Do.
Rice (third crop)	5 14 1	0 4 0	...	Actual.
Fallow (8 years)	...	2 0 0	...	
Total ...	22 8 2	2 12 0	12.21	

The estimated value of the first crop is based on the actual outturn figures obtained in Mr. Kelkar's second experiment, where however the crop was the third in the rotation. Therefore the estimate is not too high, but is probably too low. The niger seed estimate is certainly not too high for a second rotation crop after 8 years' fallow.

Black *barag* (Exp. No. 127) was the subject of Mr. Kelkar's second experiment. The field was almost level and the soil had a tinge of red. No manure is ever used and the field is allowed to lie at rest for 7 years after 5 years' cropping. The crop tested was the third in the rotation. Season was favourable and cultivation careful. The crop yielded 676 lbs. of grain worth Rs. 10-10-1 per acre. This represents a 17-anna outturn according to the formulæ. The following table shows the gross average outturn estimated by the experimenter for this field :—

Crop.	Value of Outturn per Acre.	Assessment per Acre.	Average Incidence of Assessment.	Remarks.
	Rs. a. p.	Rs. a. p.	Per cent.	
Kulith (first crop)	5 8 0	0 4 0	...	Estimate.
Harik (second crop)	15 0 0	0 4 0	...	Do.
Barag (third crop)	10 10 1	0 4 0	...	Actual.
Niger (fourth crop)	6 0 0	0 4 0	...	Estimate.
Sava (fifth crop)	9 0 0	0 4 0	...	Do.
Fallow (7 years)	...	1 12 0	...	
Total ...	46 2 1	3 0 0	6.50	

Mr. Kelkar probably over-estimates the value of *harik*. An average of 12 experiments taken in some of the talukas of this district during the last 5 years gives the acre value at Rs. 7-13-10. In Mr. Kelkar's fifth experiment it comes to Rs. 6-12-11, but the crop there occupies the third place in a series of four crops, while in the present test it occupies the second place in a series of five crops. It is improbable that *sáva*, the last crop in the rotation, would yield Rs. 9 worth of produce per acre. But even if considerable reductions were made on their account the incidence of assessment on value of gross produce would still be quite moderate.

Mr. Kelkar's third experiment (No. 128) was on niger seed, which was the last crop in the rotation. The soil is more highly assessed than that of any other fields experimented upon and grows *barag*, *harik* and niger seed in succession after 4 years' fallow. The outturn is poor, probably because of careless cultivation and the exhausted condition of the soil. The average incidence of assessment based on the experimenter's estimates works out as under :—

Crop.	Value of Outturn per Acre.	Assessment per Acre.	Average Incidence of Assessment.	Remarks.
	Rs. a. p.	Rs. a. p.	Per cent.	
Barag (first crop)	18 0 0	0 8 0	...	Estimate.
Harik (second crop)	8 0 0	0 8 0	...	Do.
Niger (third crop)	5 7 10	0 8 0	...	Actual.
Fallow (4 years)	...	2 0 0	...	
Total ...	31 7 10	3 8 0	11.12	

In this case no good purpose can be served by trying to draw deductions from the outturn results of the tested field or from the experimenter's estimates of the yields of the other crops of the rotation. The field bears a higher assessment than any of the other fields experimented upon and under good management ought to be more productive than the other fields. If the crop tested is not decidedly under average the burden of assessment would be heavy. The whole crop only occupied 12 gunthas, of which 8 were actually tested.

Rági formed the subject of Mr. Kelkar's fourth experiment (No. 129). It was the second crop in a series of four crops taken after 6 years of fallow. The seed was at first sown in a raised seed-bed and the seedlings when transplanted were top-dressed with fish manure. The outturn, 1,217 lbs. per acre of grain, worth Rs. 26-4-2, was quite satisfactory. The following table shows the average incidence of assessment calculated on the experimenter's estimates which are, I think, fair. The fish manure applied to the *rági*, and which cost Rs. 5-9-7 per acre, would no doubt keep to defer exhaustion of the soil, so that the crops subsequently taken would be benefited :—

Crop.	Value of Outturn per Acre.	Assessment per Acre.	Average Incidence of Assessment.	Remarks.
	Rs. a. p.	Rs. a. p.	Per cent.	
Kulith (first year)	8 4 0	0 4 0	...	Estimate.
Rági (second year)	26 4 2	0 4 0	...	Actual.
Harik (third year)	10 0 0	0 4 0	...	Estimate.
Niger (fourth year)	6 0 0	0 4 0	...	Do.
Fallow (6 years)	...	1 8 0	...	
Total ...	50 8 2	2 8 0	4.95	

The average incidence is decidedly light. The field is tilled by the occupant conjointly with a partner. Both have agreed to supply labour and to pay

expenses equally; two *pāylis* (8 *seers*) per maund of the produce is received by the occupant in right of ownership and the rest divided equally between the two.

Harik was the crop next experimented upon (No. 130). The field has white gravelly soil locally called *khārlat bhardi*. It had been manured for the *rāgi* which preceded the test crop with a quantity of ashes and cowdung. It grows *kulith*, *nāgli*, *harik* and niger after 8 years' rest. Fifteen pounds of seed sown in June produced in the middle of October 714 lbs. of grain which compared with the formulæ standard can be classed as an 18-anna yield. The average incidence of assessment based on the experimenter's estimates is shown below. The *kulith* estimate is, I think, too low and the *nāgli* estimate perhaps too high:—

Crop.	Value of Outturn per Acre.	Assessment per Acre.	Average Incidence of Assessment.	Remarks.
	Rs. a. p.	Rs. a. p.	Per cent.	
Kulith (first year)	4 9 2	0 4 5	...	Estimate.
Nágli (second year)	20 9 2	0 4 5	...	Do
Harik (third year)	6 12 11	0 4 5	...	Actual.
Niger (fourth year)	5 5 4	0 4 5	...	Estimate.
Fallow (8 years)	...	2 3 4	...	
Total	37 4 7	3 5 0	8.88	

The average incidence is less than 9 per cent. on the experimenter's estimates. The test field measures 36 gunthas and is rented by a tenant who pays for the occupancy right one rupee per annum in years of cropping. The average incidence of this rent on the value of estimated produce works out 10.10 per cent.

Mr. Kelkar's last experiment (No. 131) was on *rāgi* on a very steep stony *varkas* field that grew only 2 crops, *barag* and *rāgi*, after leaving the land uncultivated for 20 years. The field is so steep that ploughing is impossible. *Rāgi* was as usual sown at first on *rābed* seed-bed before being transplanted on the field which has previously been given a light dressing of cowdung and ashes. The outturn is only slightly below that in Mr. Kelkar's fourth test which had the benefit of a liberal application of fish manure. The experimenter estimates the value of the other crop, *barag*, grown in rotation with *rāgi* at Rs. 18 per acre. The average incidence works out 6.23 per cent. I consider the estimate for *barag* too high.

Ka'nara.

Experiments on *rāgi* and early and late rice were required from this district. Mr. Divátia had arranged for an experiment on *rāgi*, but had to give it up owing to sudden rainfall which injured the selected crop. Later he could not do any out-door work owing to ill-health. Mr. McNeill could not test *rāgi* and early rice, as owing to somewhat short rainfall the crops were harvested before the commencement of the touring season. He has sent in two careful tests on summer rice.

Mr. N. B. Divátia, Assistant Collector,

Reports a rice test. The experimenter was prevented from conducting a rice test in the coast villages of Kārwar and Ankola by heavy rain at harvest time and selected a field in the hill side tracts where the rice ripened later. The tested crop (No. 132) was an inferior variety of rice, but was grown from transplanted seedlings. The field has light brown soil. It bears an assessment of Rs. 2-8-0 per acre and grows rice every year. It is irrigable from an adjoining *nāla*. The water was deficient this year, being only sufficient for about $\frac{3}{4}$ of the field. The field as well as the seed-bed was manured with a compost of decomposed cowdung, leaves, ashes and litter. The application was equal to about 3 tons per acre. The seed-rate is reported at 48 lbs. per acre.

Outturn, &c., results are as under:—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn per Acre.	Assessment per Acre.	Percentage Incidence of Assessment.
		Principal Product.	By-product.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
Exp. No. 132 ...	12	1,489	6,482	26 11 2	2 8 0	9.36

The grain was valued at 62½ lbs per rupee.

Mr. J. McNeill, Assistant Collector,

Submits two tests on *vaingan* rice which gave rather poor results as compared with results of other tests on the same crop in former years. The experiments (Nos. 133 and 134) were carefully conducted and well reported. The tests were taken on adjoining survey numbers which are in the occupation of the same Khátedár. Each field grows a rain crop as well as a summer crop of rice.

The soil of each is friable and light. The respective assessments are Rs. 5-5-11 and Rs. 5 per acre. The rain crop and the *vaingan* rice were each directly manured, the latter a short time before sowing. The manure used was a compost of cattle droppings and forest litter. The application to the first field was about 370 head-loads and to the second 470 per acre. The former was considered a light dressing. The seed-rate of the first field, 308 lbs. per acre, is exceedingly high. That of the second, 195 lbs. per acre, does not differ much from the rates reported for the crop in the reports of 1892-93 and 1893-94. The fields are irrigable by channel which dries up about the 1st week in March or a little too soon for the full requirements of the crop. The *vaingan* rice was only grown as usual in a portion of each number. In the first field 2 acres 30 gunthas out of 7 acres 17 gunthas were so cultivated, and in the second 1 acre out of 2 acres 16 gunthas. Other second non-irrigated crops were grown however in both fields but not over the whole area of each.

Mr. McNeill describes the cultivation of the tested crops thus:—

"The first crop on the land was removed about the end of November or beginning of December. Almost immediately the work of preparing the ground for the second crop was begun. The ground was ploughed in one direction, then across, and again as at first. The surface was then smoothed and allowed to rest for a few days. Again it was ploughed; the manure was filled into the muddy ruts, again ploughed cross and smoothed with *Nale* (bullock drawn). An additional levelling was given by two men who dragged across the ground a betel-tree stem by ropes attached to either end. A stone bound up in straw was next pulled in two or three irregular lines over the surface. The object of this dragging of the stone and of the betel-stem is in the one case to make grooves or ruts in the ground by which the water will readily pass to every part of the field and also pass from it; while the betel-stem makes the rest of the surface quite level and facilitates the flow of water over it. These operations being over, the water which had been previously turned on is drained off. The seed is sown broadcast and allowed to germinate for 7 days, when, the seedlings being well up, water is again turned on and is kept at a height of about half a foot until the beginning of March, i.e. about 20 days before cutting."

Outturn, &c., results are as under:—

	Anna Estimation.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		Principal Product.	By-product.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
First field (Exp. No. 133) ..	16	960	2,730	18 0 5	5 5 11	30.07
Second do. (Exp. No. 134)...	14	520	2,040	9 15 4	5 0 0	50.21

The value of the rain crop, if added, would of course reduce the incidence. It is doubtful whether the crop of the second test paid expenses.

J. W. MOLLISON,

Poona, 21st October 1895.

Superintendent of Farms, Bombay Presidency.

TABULAR SUMMARIES.

Summary of Crop Experiment Reports,

O. S. = Original Survey;

No.	District, Taluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formula.	AVERAGE PER ACRE.						Area of Test.
					Seed.	Yield of		Total Value of Produce.	Assessment, excluding local funds.	Incidence of Assessment on the Value of Gross Produce.	
						Principal Product.	By-Product.				
1	2	3	4	5	6	7	8	9	10	11	12
	AHMADABAD.		Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.	A. g.
	<i>Mr. J. K. N. Kábráji,</i> <i>Assistant Collector.</i>										
1	Daskrohi (Odhav) ...	Gram, 7th April 1895.	20	900	55	1,287	...	23 8 6	4 10 8 R. S.	19.83	0 4
2	Do. (Ghodásar) ...	Do. 19th April 1895.	14	590	33	1,012	...	20 9 0	3 15 4 R. S.	19.25	0 5
3	Do. (do.) ...	Do. do. ...	11	465	34	618	...	12 0 9	5 9 11 R. S.	46.64	0 4
	<i>Mr. Jethálál Varajbhái,</i> <i>District Deputy Collector.</i>										
4	Dhandhuka (Dhandhuka).	Do. 20th February 1895.	12	450	20½	506	230	13 9 6	3 11 4 R. S.	27.28	0 8
5	Do. (do.)	Do. 21st February 1895.	12	450	20½	260	76	6 13 7	4 8 2 R. S.	65.85	0 10
6	Do. (do.)	Do. 22nd February 1895.	12	450	20½	439	124	11 7 2	4 3 6 R. S.	36.85	0 10
	KAIRA.										
	<i>Mr. E. H. E. Leggatt,</i> <i>Assistant Collector.</i>										
7	Kapadvanj (Daiap)	Wheat, 20th February 1895.	12	900	77	642	538	24 1 0	2 7 3 O. S.	10.19	0 8
8	Do. (Navágám)	Do. 26th February 1895.	8	660	24	241	308	9 11 0	1 10 5 O. S.	17.04	0 8
	<i>Mr. Bamañji Edalji,</i> <i>Modi, District Deputy Collector.</i>										
9	Mátar (Radhránaj)	Spiked millet (Báñri), 14th October 1894.	14	50	8½	364	1,923	21 1 6	3 14 1 R. S.	18.39	0 8

Northern Division, 1894-95..

R. S. = Revision Survey.

Equivalent in Tolas of local measure Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
	Principal Product.	By-Pro- duct.	
13	14	15	16.
Tols.	Lbs.	Cwts.	
40 (weight Ser).	54½	...	<i>Experiment No. 1.</i> —Gram grown as a second crop on new <i>kiari gorádu</i> soil growing rice every year followed by gram only in years of ample late rainfall. The test crop not directly manured but the rice which preceded it received a liberal dressing of 17 carts of ordinary manure per acre. Tillage good and season favourable. Seed rate high. The outturn nearly 1½ times the maximum crop of the formulæ. Pulse valued rather cheap; the by-product not valued at all though fed to cattle. Test area below the prescribed minimum in this and the following two tests. Incidence on the 2nd crop alone.
Do.	49¼	...	<i>Experiment No. 2.</i> —Same crop on unmanured sandy <i>gorádu</i> soil growing as above rice followed by a second crop of gram only in years of seasonable late rain. No second crop was raised on the field during the past 6 years. Season and tillage as above. Crop full maximum. Incidence on 2nd crop only.
Do.	51¼	...	<i>Experiment No. 3.</i> —Same crop on similar soil on which no crop was raised during the previous year owing to absence of cultivator. Season, &c., as above. Crop 15 annas according to the formulæ.
Do.	41	1½	<i>Experiment No. 4.</i> —Same crop on an unmanured good black dry-crop land growing usually cotton and <i>juvár</i> in alternate years. Gram sown this year owing to partial failure of <i>juvár</i> by excessive October rains. Season and tillage good. Seed rate low. Burden of assessment in this and the following 2 tests cannot fairly be gauged by the value of the test crops as these were merely catch crops intended to minimise the cultivator's loss consequent upon an unfavourable season.
Do.	41	1½	<i>Experiment No. 5.</i> —Do. do. do. Tillage indifferent. Crop only 7 annas.
Do.	41	1½	<i>Experiment No. 6.</i> —Do. do. do. Tillage good.
Do.	29½	1¾	<i>Experiment No. 7.</i> —Unirrigated wheat as a second crop on <i>kiari</i> land growing rice followed by wheat for the last 3 years. The first crop manured with 16 carts of ordinary manure per acre. Cultivation very careful and season very fair. Crop only 8 annas according to the formulæ.
Do.	29½	1¾	<i>Experiment No. 8.</i> —Same crop on dry-crop land under similar rotation. Tillage bad, the field being full of weeds. Seed rate very low and the outturn represents only a 3-anna crop of the formulæ.
Do.	32½	1¾	<i>Experiment No. 9.</i> — <i>Bájrí</i> with pulse mixtures on a light <i>gorádu</i> soil growing (1) <i>bájrí</i> , (2) <i>kodra</i> with subordinate pulses and (3) <i>bávto</i> in succession. No manure applied for the test crop but the land liberally treated with 30 carts per acre of ordinary manure during the past two years. Crop damaged by excessive rain during the flowering period, which reduced the outturn to 6-anna yield of the formulæ. Tillage good. By-product valued very high at Rs. 10 per acre. Outturn of subordinate pulses neglected.

Summary of Crop Experiment Reports,

O. S. = Original Survey ;

No.	District, Taluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formula.	AVERAGE PER ACRE.						Area of Test.
					Seed.	Yield of.		Total Value of Produce.	Assessment, excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.	
						Principal Product.	By-Product.				
1	2	3	4	5	6	7	8	9	10	11	12
			Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.	A. g.
	KAIRA—continued.										
	Mr. Bamanji Edalji Modi, District Deputy Collector—continued.										
10	Matar (Khadiálpura);	Spiked millet (Bájrí), 22nd October 1894.	16	975	10	585	1,395	23 7 0	4 8 3 R. S.	19.26	0 8
	PANCH MAHA'LS										
	Mr. B. R. Heblkar, District Deputy Collector.										
11	Jhálod (Jhálod);	Rapeseed (Sarsav), 12th March 1895.	12	450	13 ³ / ₄	359 seed.	848	17.13 0	2 0 0 R. S.	11.22	0 8
12	Dohad (Dohad)	Gram, 18th March 1895.	16	975	50	1,313	1,313	22 10 8	1 13 9 R. S.	8.20	0 10
13	Do. (Nágrála)	Do., 22nd March 1895.	12	730	46	846	615	14 6 0	1 4 9 R. S.	9.02	0 8
	Mr. Pránál Harikandás, District Deputy Collector.										
14	Kálol (Vejalpur)	Eleusine Coracana (Bávto), 1st November 1894.	12	1,010	9	651	2,906	15 3 0	1 11 10 O. S.	11.45	0 8
15	Do. (do.)	Do. do. ...	12	1,010	10	651	2,651	15 1 2	1 10 8 O. S.	11.06	0 15
16	Do. (Chimanpur)	Do. do. ...	10	840	9	691	2,640	15 14 6	0 11 7 O. S.	4.56	0 10

Northern Division, 1894-95—continued.

R. S. = Revision Survey.

Equivalent in Tolas of local measure Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
	Principal Product.	By-Pro- duct.	
13	14	15	16
Tolas.	Lbs.	Cwts.	
40 (weight Ser).	32½	2½	<i>Experiment No. 10.</i> — <i>Bājri</i> with similar mixtures on similar soil manured with 16 carts per acre of farm yard manure. <i>Bávto</i> grown on the land in each of the three previous years. Seedlings from the first sown seed eaten up by caterpillars; a fresh sowing was therefore made late in July. Season, &c., as above. Tillage very careful. Crop 10 annas of the formulæ. The subordinate pulse failed entirely owing to unseasonable sowing.
Do. ...	20½	24	<i>Experiment No. 11.</i> —Rapeseed as a second crop on <i>gorádu</i> soil growing maize every year followed by wheat, gram or rapeseed. The first crop manured with 10 carts of cowdung per acre. Season good; but tillage indifferent. Seed rate nearly double the formulæ standard. The outturn only a 9-anna crop of the same standard. Incidence on 2nd crop only, and hence very light.
Do. ...	61½	8½	<i>Experiment No. 12.</i> —Gram on similar soil after maize which had received a liberal dressing of 16 carts of cowdung per acre. This field grows maize every year followed by either gram alone or with rapeseed. Season and tillage both good. Outturn full maximum.
Do. ...	61½	8½	<i>Experiment No. 13.</i> —Do. do. Soil lightly dressed with 6 carts of cowdung per acre for the first crop. Rotation:—(1) rice and tobacco, (2) and (3) maize and gram. Season, &c., as above. Crop 14 annas.
Do. ...	46½	22	<i>Experiment No. 14.</i> — <i>Bávto</i> with <i>math</i> on red <i>gorádu</i> soil growing without manure <i>bājri</i> and <i>bávto</i> with pulses on different parts of the field. Late heavy rain damaged the crop to some extent. Tillage good. Subordinate crop being unripe at date of experiment was not tested. Seven gunthas of seed-bed furnished seedlings for an acre of plantation. Outturn represents an 8-anna crop of the formulæ.
Do. ...	46½	22	<i>Experiment No. 15.</i> — <i>Bávto</i> without any mixture grown continuously on red brown <i>gorádu</i> soil. Season, &c., as above. Seedlings from 5½ guntha seed-bed suited for an acre of transplantation.
Do. ...	46½	22	<i>Experiment No. 16.</i> —Same crop with <i>math</i> as in experiment No. 14 on brown <i>gorádu</i> soil manured with about 15 carts of cowdung per acre. Rotation:— <i>bājri</i> with pulses grown in alternate years with <i>bávto</i> . Season, &c., as above. Area of seed-bed per acre of transplantation reported at 4½ gunthas in the case of this field. Subordinate crop not tested.

Summary of Crop Experiment Reports.

O. S. = Original Survey;

No.	District, Taluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formula.	AVERAGE PER ACRE.						Area of Test.
					Seed.	Yield of		Total Value of Produce.	Assessment, excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.	
						Principal Product.	By-Product.				
1	2	3	4	5		7	8	9	10	11	12
	BROACH.		Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.	A. g.
	<i>Mr. Phirozsháh Pestanji, District Deputy Collector.</i>										
17	Ankleshvar (Pánoli).	Rice (Jádu sáliu), 20th October 1894.	18	1,750	100	2,769 in husk	1,900	52 8 5	10 0 0 S.	19.03	0 8
	<i>Mr. J. W. S. Dracup, District Deputy Collector.</i>										
18	Amod (Bhimpura) ...	Chickling Vetch (Láng), 15th February 1895.	11	465	41	768	1,050	22 3 5	5 3 8 O. S.	23.54	0 8
19	Do. (Rohodh) ...	Great millet (Juvár), 15th February 1895.	14	920	9	468	1,570	16 12 4	4 10 6 O. S.	27.76	0 8
20	Jambusar (Tundaj)...	Wheat (Hánsia), 28th February 1895.	19	1,220	43	742	790	24 13 6	3 11 4 O. S.	14.95	0 8
	<i>Mr. Sorábsháh Hormasji, District Deputy Collector.</i>										
21	Ankleshvar (Gadhkhoh).	Cotton (Deshi), 22nd and 30th March, 13th April and 1st May 1895.	10	280	9 ² / ₃	227 seed cotton.	...	17 6 9	5 12 3 O. S.	33.09	0 10
22	Do. (Málanpor).	Sesamum (Til), 31st January 1895.	12	450	1	153 seed.	...	11 5 8	3 8 0 O. S.	30.82	0 8
	SURAT.										
	<i>Mr. P. Q. Cadell, Assistant Collector.</i>										
23	Jalálpur (At) ...	Sugarcane (Vánsi), 27th January 1895.	16	5,250	2,084 whole canes.	4,945 gul.	5,010 bundles of leaves.	265 2 3	13 8 8 O. S.	5.10	0 4

Northern Division, 1894-95—continued.

R. S. = Revision Survey.

Equivalent in Tolas of local measure Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
	Principal Product.	By-Pro- duct.	
13	14	15	16
Tolas.	Lbs.	Cwts.	
40 (weight ser).	54½	9	<i>Experiment No. 17.</i> — <i>Jadu sáliu</i> or inferior rice grown continuously on fairly good crumbling black soil commanded by the village tank from which the crop was irrigated this year only once at the beginning of October. Seedlings from one guntha of seed-bed covered 12 gunthas of the field. The seed-bed alone was manured with about 5 carts of farm yard manure. Season very favourable; but tillage reported to be indifferent. Weeding was neglected and embankments that had been washed away were not repaired. Seed rate very high. Outturn very satisfactory being more than maximum of the formulæ (2,000 lbs.).
Do. ...	62½	1 nearly.	<i>Experiment No. 18.</i> — <i>Láng</i> or chickling vetch on deep black low-lying land growing, without manure, cotton alternately with <i>juvár</i> , <i>láng</i> or wheat. The crop was unseasonably sown, excessive rain at end of October rendering the field unfit for earlier sowing. Later on, cloudy weather brought on caterpillars which damaged the crop to a considerable extent throughout the district. Tillage good. The yield represents an 18-anna crop of the formulæ, though estimated at 11 annas only. By-product valued very high, at about 106 lbs. per rupee.
Do. ...	42½	2½	<i>Experiment No. 19.</i> — <i>Rabi juvár</i> on a similar field lightly dressed with ordinary manure and growing as above, cotton in alternate years with <i>juvár</i> , <i>láng</i> , wheat or <i>tur</i> . Season, &c., as above. First owing destroyed by excessive rain; seed sown again very late in the season. The crops represented only a 7-anna formulæ outturn.
Do. ...	33½	2½	<i>Experiment No. 20.</i> —Unmanured and unirrigated wheat, <i>lánsia</i> on similar soil growing (1) cotton and (2) wheat or <i>juvár</i> . Season fairly good for this crop and tillage also good. Seed rate low. The outturn over estimated at 19 annas, being only 12 annas according to the formulæ standard.
Do. ...	13½	...	<i>Experiment No. 21.</i> —Cotton on good black soil manured in the previous year by folding sheep. Rotation:—(1) cotton, (2) sesamum and <i>tur</i> and (3) cotton and rice. Excessive rain in the beginning of the season prevented timely sowing, and the heavy cyclonic rains in October-November damaged the crop considerably. Further there was dropping of bolls, owing to excessive cold on 3 consecutive nights in January. Season unfavourable. Crop picked four times, the last 3 pickings being supervised by Mámledár. Outturn 8 annas of the formulæ.
Do. ...	13½	...	<i>Experiment No. 22.</i> —Sesamum on fair black soil alternating with cotton. Field lightly manured by folding sheep in the previous year. Season very unfavourable, late rains in October proving injuriously heavy for sesamum. Tillage good. Outturn poor, being only a 4-anna crop according to the formulæ. Incidence of assessment in consequence somewhat high.
37½ (weight Ser).	20½	200 bundles of leaves.	<i>Experiment No. 23.</i> —Sugarcane <i>Vánsi</i> on rich <i>kiari</i> land growing rice followed by <i>val</i> for 4 years and by sugarcane in the 5th. Field manured with 20 cart-loads of cattle dung per acre and about Rs. 16 worth of castor-cake per acre was applied as a top dressing. Crop irrigated 14 times from a well in an adjoining field. Season favourable and tillage careful. Crushed cane was used as fuel in addition to <i>tur</i> stalks and tops were fed to cattle working the mill and therefore their value not entered in column 9. The dry leaves valued very high, at Rs. 25 per acre.

Summary of Crop Experiment Report.

O. S. = Original Survey

No.	District, Táluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formula.	AVERAGE PER ACRE.							Area of Test.
					Seed.	Yield of		Total Value of Produce.	Assessment, excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.		
						Principal Product.	By-Product.					
1	2	3	4	5	6	7	8	9	10	11	12	
	THA'NA.		Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.	A. g.	
	Mr. L. G. Deshmukh, Assistant Collector.											
24	Sl áhápur (Mokhávrne)	Eleusine coracana (Nágli, white), 9th November 1894.	16	800	8	581	...	13 2 0	0 2 11 O. S.	1.31	0 8	
25	Do. (do.).	Do. (red), do.	20	1,000	8	890	...	19 6 0	0 3 4 O. S.	1.07	0 8	
	Mr. U. W. M. Hudson, Assistant Collector.											
26	Dáháru (Káse) ...	Gram, 5th March 1895.	18	450	118	957	...	33 7 0	1 8 11 O. S.	4.65	0 8	
27	Do. (Umbargaon).	Large fruited dolichos (Vál) 31st March 1895.	11	230	75	760	1,261	16 4 0	3 13 4 O. S.	23.59	0 8	
	Mr. V. R. Patwardhan, District Deputy Collector.											
28	Bhivandi (Nánditne).	Gram, 13th March 1895.	16	400	74	827	...	22 6 4	1 7 7 O. S.	6.58	0 10	
29	Do. (do.).	Do. do.	8	100	74	281	...	7 9 7	3 12 5 O. S.	49.69	0 10	
	Mr. F. H. Hearn, Deputy Superintendent, Konkan Revenue Survey.											
30	Bassein (Boling) ...	Sugarcane, 24th March 1895.	14	3,350	2,200 canes.	5,789 gul.	14,820 tops.	262 0 0	4 7 7 O. S.	1.70	0 2	
31	Máhim (Pástal) ...	Lucerne grass, 18th February 1895.	...	...	...	6,824	...	85 4 9	3 14 9 O. S.	4.59	0 9 1/4	
	Mr. A. G. Hudson, Assistant Superintendent, Konkan Revenue Survey.											
32	Sálsette (Mulund) ...	Phul or Bondhani grass.	18	...	...	3,968	...	27 6 6	0 14 0 O. S.	3.19	0 10	
33	Do. (Náhur) ...	Do. ...	20	...	...	4,110	...	28 0 0	1 11 11 O. S.	6.25	0 10	
34	Do. do. ...	Do. ...	20	...	...	4,904	...	32 11 6	2 0 1 O. S.	6.11	0 10	
35	Do. (Mulund) ...	Do. ...	11	...	...	1,764	...	21 0 0	0 11 6 O. S.	3.57	0 10	
36	Máhim (Tembode)...	Do. ...	20	...	...	4,760	...	19 12 10	0 2 10 O. S.	0.94	0 10	
37	Sálsette (Mulund) ...	Ber grass ...	11	...	...	3,164	...	16 0 0	5 4 10 O. S.	36.71	0 10	

Northern Division, 1894-95—concluded.

R. S. = Revision Survey.

Equivalent in Tolas of local measure Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
	Principal Product.	By- Product.	
13	14	15	16
Tolas.	Lbs.	Cwts.	
54	44½	...	Experiment No. 24.— <i>Nāgli</i> on unmanured upland <i>varkas</i> land, growing <i>nāgli</i> for 2 years in succession after lying fallow for one year. Proportionate area of seed-bed to that of field ascertained to be as 1:4. Season on the whole good. Late heavy rains did little injury to this crop as compared to rice. Tillage careful. Crop 13 annas of the formulæ.
56	46	...	Experiment No. 25.—Same crop on more favourably situated land, being just below the village manure heaps and receiving their wash during rain. <i>Nāgli</i> is followed by <i>vari</i> and <i>udid</i> and then the land is allowed rest for a year. Other conditions as above. Crop 18 annas of the formulæ.
70	28½	...	Experiment No. 26.—Gram as a second crop on good but unmanured rice land retentive of moisture, growing rice followed by gram in each of the past 3 years. Late rains which injured the kharif crop benefited the pulse. Tillage good. Seed rate very high. Outturn nearly double the maximum crop of the formulæ standard. Incidence very low though on the second crop alone.
74½	50½	9	Experiment No. 27.— <i>Vāl</i> on good kharif land growing rice every year followed by a second crop only in years of favourable rainfall. The late heavy rains of this year prevented even germination; otherwise the season was good. The reported seed rate very high. The outturn is probably much under-estimated.
72	36½	...	Experiment No. 28.—Gram on good <i>rabi chikanvat</i> land growing the same crop every year without any manure. Season favourable and tillage good. Seed rate rather high. Outturn more than double the formulæ yield for a 16-anna crop.
72	Do.	...	Experiment No. 29.—Same crop on unmanured <i>kharif</i> land growing rice every year followed by a second crop of gram or <i>vāl</i> only in years of favourable rainfall. Season as above, but tillage indifferent. Outturn represents a 13-anna crop of the formulæ. Incidence on the second crop alone.
28	23	13½	Experiment No. 30.—Dark purple sugarcane on black clay soil with a substratum of silt, growing sugarcane or plantains in alternate years with rice seedlings, followed by <i>san</i> hemp in the same year. Crop not manured before plantation, but 3 top dressings of castor-cake given; the first two months after plantations, the 2nd and 3rd, at intervals of a month afterwards. Crop irrigated every 8—10 days during the fair season from a well by means of a Persian wheel. Season favourable and tillage good. Crushed cane used as <i>rāb</i> . The tops fed to cattle working the mill valued at Rs. 10 per acre. Crop more than maximum according to the formulæ.
...	80	...	Experiment No. 31.—Lucerne on good black clay soil growing rice in the monsoon followed by lucerne in the fair season. Field manured with 6 carts per acre of goats' dung. Five cuttings usually are taken. Outturn in Column 7 represents the yield of the second cut only.
...	145	...	
...	147	...	
...	150	...	Experiments Nos. 32-35.— <i>Phul</i> or <i>bondhani</i> grass on <i>varkas</i> land growing the same crop annually for export to Bombay, the fields being favourably situated in respect of railway communication. Season favourable. Outturn good except in No. 35. The grass valued very high in the last test.
...	84	...	
...	240	...	Experiment No. 36.—Same grass on land classed as <i>rabi</i> but having <i>murum</i> underneath, declared unsuitable for growth of <i>rabi</i> crops. Outturn good but valued very cheap.
...	198	...	Experiment No. 37.— <i>Ber</i> grass on rice land left fallow for grass for the past 10 years, being unfavourably situated for rice owing to long distance from village. Season as above. Grass valued low as compared with the above experiments.

Summary of Crop Experiment Reports,

. O. S. = Original Survey;

No.	District, Taluka, Village and Experiment.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formula.	AVERAGE PER ACRE.							Area of Test.
					Seed.	Yield of		Total Value of Produce.	Assessment, excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.		
						Principal Product.	By-Product.					
1	2	3	4	5	6	7	8	9	10	11	12	
	KHANDESH.		Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.	A. g.	
38	Mr. K. R. Bamanji, Assistant Collector. Sindkheda (Nevade)	Wheat (Gore), 9th February 1895.	16	800	71	661	897	17 12 1	2 15 2 R. S.	16.60	0 15	
39	Do. (do.)... Mr. J. H. DuBoulay, Assistant Collector.	Do. (do)	16	800	71	502	615	13 4 3	2 15 1 R. S.	22.18	0 12	
40	Pimpalner (Bhadvi)	Spiked millet (Bajri), 7th November 1894.	16	640	8	295	575	5 15 4	0 5 10 O. S.	5.54	0 8	
41	Do. (Yesur)	Do. (do.)	20	800	5½	829	2,905	20 15 0	0 9 9 O. S.	2.91	0 8	
42	Do. (Sakri)	Sesamum (white Til), 7th No- vember 1894.	12	350	5	282 Seed.	...	14 7 3	0 5 9 O. S.	2.48	0 8	
43	Do. (Gondas)	Do. (white and black Til), do.	19	665	2	496 Seed.	...	23 11 2	0 10 11 O. S.	2.87	0 4	
			19	665	2	200 Seed.	...	9 7 8	0 10 11 O. S.	7.91	0 4	
44	Do. Dahivel). Mr. O. N. Seddon, Assistant Collector.	Wheat (Patha- di), 25th Feb- ruary 1895.	13	800	51	769	1,190	19 11 5	5 15 0 O. S.	30.11	0 8	
45	Savda (Savda)	Do. (Nim Bansi), 8th February 1895.	18	900	108	803	960	30 7 0	2 10 8 R. S.	8.76	0 10	
46	Do. (Yaval)	Do. do. 24th February 1895.	14	910	94	779	888	29 6 0	2 9 5 R. S.	8.81	0 10	
47	Jamner (Neri B.)	Do. (Bansi), 12th Febru- ary 1895.	16	720	65	772	1,231	25 6 8	2.12 5 R. S.	10.92	0 10	

Central Division, 1894-95.

R. S. = Revision Survey.

Equivalent in Tolas of local measure Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
	Principal Product.	By- Product.	
13	14	15	16
Tolas.	Lbs.	Cwts.	
146	45	2½	<i>Experiment No. 38.</i> —Dry crop wheat, <i>gore</i> , on unmanured black cotton soil growing during the past 3 years wheat, sesamum, gram and tobacco on different parts of the field. Heavy rain in October shortly after sowing injuriously affected the crop which was further damaged by stormy weather in January. Tillage careful. Seed-rate more than double the formulæ (32 lbs. per acre). Outturn 14 annas according to the same standard.
146	45	2½	<i>Experiment No. 39.</i> —Dry crop wheat, <i>gore</i> , on similar but somewhat uneven land which grew during the last 3 years (1) cotton, (2) <i>bājri</i> and (3) <i>jowāri</i> , wheat and tobacco. Other conditions as above. Outturn 12 annas of the formulæ.
151	49½	6½	<i>Experiment No. 40.</i> — <i>Bājri</i> on unmanured light red <i>barad</i> soil, which grows <i>bājri</i> alternately with sesamum. Tillage indifferent. A prolonged break of 6 weeks in the middle of the season checked crop and reduced outturn to 11 annas of the formulæ.
147	48½	6½	<i>Experiment No. 41.</i> —Same crop on good dark soil manured with about 9 cart-loads of cowdung per acre. The following crops were taken during the past four years—(1) sesamum, (2) cotton, (3) <i>bājri</i> and (4) <i>kulthi</i> . Season as above. Tillage careful. Seed-rate only one-half of the formulæ.
119	20	...	<i>Experiment No. 42.</i> —Sesamum on land similar to that in Experiment No. 40 lightly dressed with 9 carts of cowdung per acre. Field ordinarily grows cotton, <i>bājri</i> and <i>kulthi</i> and occasionally sesamum. Season, &c., as above. Tillage only fair. Seed-rate somewhat high.
119	21	...	<i>Experiment No. 43.</i> —Same crop on better class of soil than the above growing cotton, <i>bājri</i> and sesamum in succession. Half the field liberally manured with 24 carts of cowdung per acre. The results from this portion are shown separately from those of the unmanured portion. Season, &c., as above. Compared to the formulæ, the outturn from the manured plot represents a 15-anna crop and that from the other a 10-anna one.
120	21	...	
125	41½	8½	<i>Experiment No. 44.</i> —Irrigated but unmanured wheat on shallow <i>barad</i> land with a scattering of stones and growing (1) sugarcane, (2) rice and (3) wheat in consecutive years. • Season fair. Tillage indifferent. Incidence rather high.
144	29½	2½	<i>Experiment No. 45.</i> —Dry crop wheat, <i>nim bansi</i> , on black cotton soil lightly dressed with 5 carts of ordinary manure per acre. Rotation, (1) wheat and cotton, (2) <i>jowāri</i> with pulses and (3) wheat. Season fairly good. Tillage careful. Seed-rate very high. Outturn full average.
144	29½	2½	<i>Experiment No. 46.</i> —Same crop on similar land growing cotton, <i>jowāri</i> and wheat on different parts of the field. Garden crops are also grown under irrigation from a recently constructed well. Crop unmanured; irrigated twice late in the season. • Season as above. Tillage indifferent.
151½	37½	4½	<i>Experiment No. 47.</i> —Wheat, <i>bansi</i> , on good black cotton soil manured with about 6 carts of cowdung per acre and growing during the last three years (1) <i>jowāri</i> and wheat, (2) cotton and wheat and (3) cotton, wheat and <i>jowāri</i> . Season fair and tillage careful. Seed-rate in this and the following two tests much above average, the corresponding formulæ rate being 32 lbs. per acre. Sample ser gave an excess of 7½ tolas in this office.

Summary of Crop Experiment Reports,

O.S.=Original Survey ;

No.	District, Taluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formula.	AVERAGE PER ACRE.						Area of Test.
					Seed.	Yield of		Total Value of Produce.	Assessment, excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.	
						Principal Product.	By-Product.				
1	2	3	4	5	6	7	8	9	10	11	12
	KHANDESH— <i>continued.</i> <i>Mr. S. B. Chitgubi,</i> <i>District Deputy</i> <i>Collector—continued.</i>		Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.	A. g.
48	Jámner (Neri B.) ...	Wheat (Bansi), 12th February 1895.	16	720	80	904	1,292	29 6 5	2 3 8 R. S.	7.58	0 8
49	Do. (Jámner) ...	Do. 28th February 1895.	18	810	54	696	1,313	26 11 10	2 8 5 R. S.	9.44	0 10
50	Chálisgaon (Chális- gaon).	Spiked millet (Bájni), 5th November 1894.	16	640	5½	258	1,568	8 0 6	0 10 6 O. S.	8.17	0 10
51	Do. (do.) ...	Do. (do.)...	16	640	4½	418	1,369	12 7 4	1 2 2 O. S.	9.11	0 8
52	Do. (do.) ...	Do. (do.)...	16	640	4½	362	1,037	10 10 10	0 15 0 O. S.	8.78	0 10
	<i>Mr. Kazi Kamruddin,</i> <i>District Deputy</i> <i>Collector.</i>										
53	Dhulia (Vadjai) ...	Do. (do.) 20th October 1894.	10	250	4½	511	1,546	16 7 9	1 4 0 O. S.	7.58	0 8
54	Do. (Sávalde) ...	Do. (do.), 22nd October 1894.	8	160	9	240	769	7 5 11	0 6 3 O. S.	5.30	0 8
55	Amalner (Amalner)...	Wheat (Bansi), 12th February 1895.	12	500	73	735	1,380	26 3 2	2 6 6 R. S.	9.18	0 10
	NA'SIK. <i>Mr. R. B. Stewart,</i> <i>Assistant Collector.</i>										
56	Kalvan (Kalvan) ...	Sugarcane (Ka- de Us), 6th to 8th March 1895.	18	5,400	2,000 canes.	8,000 gul.	...	390 0 0	9 6 2 O. S.	2.40	0 4
57	Báglán (Arai). ...	Gram, 20th March 1895.	10	190	33	431	400	11 14 0	8 12 0 O. S.	73.68	0 4
	<i>Mr. G. Carmichael,</i> <i>Assistant Collector.</i>										
58	Niphád (Niphád) ...	Do. 19th January 1895.	14	440	38	570	440	22 6 1	1 8 11 R. S.	6.95	0 6

Central Division, 1894-95—continued.

R. S.—Revision Survey.

Equivalent in Tolas of local measure Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
	Principal Product.	By- Product.	
13	14	15	16
Tolas.	Lbs.	Cwts.	
150	37	4 $\frac{2}{5}$	Experiment No. 48.—Wheat, <i>bansi</i> , on similar soil manured with seven carts of cowdung per acre. Rotation: (1) <i>jowári</i> , (2) cotton and (3) <i>jowári</i> . Season, &c., as above. Outturn full maximum compared to the formulæ standard. Sample weighed in this office 12 tolas short of the recorded weight.
150	33 $\frac{3}{5}$	3 $\frac{3}{5}$	Experiment No. 49.—Wheat, <i>bansi</i> , on similar but unmanured soil. Cotton grown in each of the last three years. In 1893-94, cotton and indigo grown mixed. Other conditions same as above.
144	40 $\frac{3}{5}$	4 $\frac{3}{7}$	Experiment No. 50.— <i>Bájrí</i> unmanured on black soil mixed with lime. Same crop in each of last four years. Field last manured in 1892. Season fairly good and tillage careful. Seed-rate low and crop a 10-anna one according to the formulæ. The sample received in this office gave an excess of 2 $\frac{1}{2}$ tolas over the recorded weight.
145	41	5	Experiment No. 51.— <i>Bájrí</i> on <i>ray chikan</i> reddish black soil growing cotton in years of favourable rainfall; otherwise <i>bájrí</i> . Field last manured in 1892. Season fairly good and tillage careful. Seed-rate low, and crop a 12-anna one according to the formulæ. Sample ser gave an excess of 3 tolas.
144	40 $\frac{4}{5}$	4 $\frac{4}{7}$	Experiment No. 52.— <i>Bájrí</i> on <i>ray chikan</i> reddish black soil growing cotton in years of favourable rainfall; otherwise <i>bájrí</i> . Field last manured in 1892. Season fairly good and tillage careful. Seed-rate low, and crop less than a 12-anna one according to the formulæ. Sample 3 $\frac{1}{2}$ tolas in excess of the reported weight.
145	44 $\frac{3}{5}$	2 $\frac{3}{7}$	Experiment No. 53.— <i>Bájrí</i> on fairly good red soil growing mostly <i>bájrí</i> with subordinate mixtures and occasionally cotton also. Field manured every fifth year. About 30 carts of cowdung and other manure spread this year before the test crop was sown. Season unfavourable, the crop having suffered from the long break in the middle of the season. Seed-rate low. Outturn, compared to the formulæ, 14 annas.
140	40 $\frac{1}{5}$	2 $\frac{1}{7}$	Experiment No. 54.— <i>Bájrí</i> on <i>barad</i> land growing <i>bájrí</i> with mixtures and also cotton on portions of the field. Field manured as above every fifth year, the last dressing having been given in 1892. Season, &c., as above. Yield, compared to the formulæ, 10 annas.
142	36 $\frac{3}{5}$	2 nearly.	Experiment No. 55.—Dry-crop wheat, <i>bansi</i> , on good black cotton soil growing cotton, <i>jowári</i> , <i>bájrí</i> and wheat on different portions of the field. Portion under wheat manured with about 8 carts of cowdung per acre. Season favourable for wheat. Tillage careful. Seed-rate very high. Crop under-estimated at 12 annas, being 15 annas of the formulæ standard.
80	20 $\frac{1}{2}$	...	Experiment No. 56.—Sugarcane, <i>kade us</i> , a thin hard variety on good deep black soil which grew during the last four years, (1) maize and wheat, (2) groundnut, (3) sugarcane and (4) maize and wheat. Crop irrigated from a <i>bandhára</i> with perennial water-supply. The extent of irrigation not reported. Field liberally manured with 41 carts of cattledung per acre. Season excellent and tillage good. Seed-rate low.
140	38 $\frac{1}{3}$	5 $\frac{1}{3}$	Experiment No. 57.—Gram as a second crop on similar soil manured with 33 carts of cattle manure and household refuse, and growing <i>bájrí</i> or sesamum followed by gram almost every year. Occasionally rice is grown. Season good and tillage fair. Outturn poor and incidence, though on a second crop, high.
117	42	2 $\frac{1}{3}$	Experiment No. 58.—Gram with a sprinkling of <i>kardai</i> on friable black soil, <i>bhurkat</i> , which grew during the past three years, (1) wheat, (2) <i>bájrí</i> , gram and linseed and (3) wheat during the past three years. No rain crop taken this year. Crop manured with 6 carts of cowdung and town sweepings per acre. Season favourable and tillage good. Outturn more than [maximum of the formulæ (650 lbs.). Sample ser weighed 2 $\frac{1}{2}$ tolas short of the reported weight.

Summary of Crop Experiment Reports,

O. S. = Original Survey;

No.	District, Taluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formula.	AVERAGE PER ACRE.							Area of Test.
					Seed.	Yield of		Total Value of Produce.	Assessment, excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.		
						Principal Product.	By-Product.					
1	2	3	4	5	6	7	8	9	10	11	12	
	NA'SIK—continued. <i>Mr. G. Carmichael,</i> <i>Assistant Collector—</i> <i>continued.</i>		Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.	A. g.	
59	Yeola (Nágde) ...	Great millet (Shálu Jowári), 4th February 1895.	6	150	12	171	865	6 11 2	0 9 6 R. S.	8.86	0 8	
60	Do. (Nagarsul) ...	Gram, 27th February 1895.	12	325	51	946	385	20 2 6	1 8 2 R. S.	7.49	0 8	
	<i>Mr. C. M. Thatte,</i> <i>District Deputy</i> <i>Collector.</i>											
61	Násik (Mahirávni) ...	Eleusine coracana (Nágli), 30th November 1894.	14	1,000	2½	1,168	...	32 0 0	0 4 3 R. S.	0.83	0 10	
62	Do. (Násik) ...	Rice (Kamod), 7th December 1894.	8	450	50	2,086 in husk.	...	46 8 0	8 8 3 R. S.	18.1	0 10	
	<i>Mr. G. H. Hampton,</i> <i>Assistant Superintendent,</i> <i>Deccan Revenue Survey.</i>											
63	Kalvan (Deuli) ...	Sesamum (white Til), 6th November 1894.	10 to 12	220 to 350	4½	275 seed.	...	14 13 6	5 13 4 O. S.	9.9	0 4	
64	Do. (do.) ...	Do. (red-Til), 9th November 1894.	12	350	2½	108 seed.	...	5 1 8	0 10 0 O. S.	12.24	0 8	
65	Do. (Rámeshvar). ...	Rice (Kamod), 12th December 1894.	16	1,800	24	902 in husk.	...	26 2 9	7 0 5 O. S.	22.37	0 4	

Central Division, 1894-95—continued.

R. S. = Revision Survey.

Equivalent in Tolas of local measure Ser.	PRICES OF PRODUCE PER RUPUR.		REMARKS.
	Principal Product.	By- Product.	
13	14	15	16
Tolas.	Lbs.	Cwts.	
115	63	2	<i>Experiment No. 59.</i> —Jowari with similar sprinkling on inferior black soil, growing <i>ba'jri</i> and <i>jowari</i> in alternate years. Sheep were folded on the field but extent of folding not reported. Season unfavourable. Excessive rain in November lodged the crop. Tillage good; crop poor. Sample gave a difference of 4 tolas.
120	49 $\frac{1}{2}$	3 $\frac{2}{3}$	<i>Experiment No. 60.</i> —Gram as a second crop on <i>shervat</i> or friable black soil with lime at a depth of 1 $\frac{1}{2}$ foot, growing without manure <i>ba'jri</i> followed by wheat or gram with the assistance of water from a <i>bandhara</i> . Test crop irrigated, but its extent not recorded. Season favourable and tillage good. Seed-rate, above average. Crop 1 $\frac{1}{2}$ times the formulæ maximum. Sample ser weighed in this office 117 tolas only.
89	36 $\frac{1}{2}$	...	<i>Experiment No. 61.</i> —Na'gli on reddish <i>mil</i> stony soil, growing without manure two crops of <i>na'gli</i> after one year's fallow; 1 $\frac{1}{2}$ gunthas of seed-bed sown with 2 $\frac{1}{2}$ lbs. of seed is said to have furnished seedlings sufficient for an acre of plantation. This is doubtful. Season good; tillage indifferent. Na'gli valued rather high, while the by-product not valued at all.
82	45	...	<i>Experiment No. 62.</i> —Rice, <i>kamod</i> , on good black soil, growing in successive years (1) groundnut, (2) rice and (3) sugarcane. Field prepared for rice by ploughing in a green manure crop of <i>san</i> hemp. Crop watered from a <i>pa't</i> . Seed-rate high. Outturn much under-estimated at 8 annas, the formulæ value for a similar crop being 18 annas.
113	18 $\frac{1}{2}$	...	<i>Experiment No. 63.</i> —White sesamum on shallow <i>barad</i> soil mixed with <i>murum</i> and irrigated from a <i>pa't</i> , charge for which has been included in the assessment. Rotation during the last three years:—(1) <i>ba'jri</i> and gram, (2) <i>ba'jri</i> and (3) sugarcane. The last named crop was grown before the tested crop and was liberally manured. Drought in the middle of the season, and heavy rain at end of monsoon injuriously affected the tested crop. Tillage good. Seed-rate high. The cultivator intended to grow wheat as a second crop after <i>til</i> , and as the wheat would get the whole benefit of the <i>pa't</i> water, it ought to bear the chief part of the assessment.
120	21	...	<i>Experiment No. 64.</i> —Red sesamum on light unmanured <i>barad</i> soil growing <i>ba'jri</i> , linseed, and <i>til</i> without any fixed rotation. Season as above; the crop withered owing to the lengthy drought; and outturn 7 annas according to the formulæ standard.
105	34 $\frac{1}{2}$	...	<i>Experiment No. 65.</i> — <i>Kamod</i> rice broadcasted on low-lying fairly good rice land, which grows <i>ba'jri</i> , <i>til</i> , sugarcane and rice; the first two followed by wheat as a second crop. No manure used for the rice which was irrigated by channel from a <i>bandhara</i> with ample water. Season excellent. Tillage good. The crop lodged. Seed-rate, 24 lbs. per acre, is under average for broadcast sowing. Outturn 11 annas of the formulæ. By-product left on the field to rot; hence neither weighed nor valued.

Summary of Crop Experiment Reports,

O. S.=Original Survey;

No.	District, Taluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formulae.	AVERAGE PER ACRE.						Area of Test.
					Seed.	Yield of		Total Value of Produce.	Assessment, excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.	
						Principal Product.	By-Product.				
1	2	3	4	5	6	7	8	9	10	11	12
	NA'SIK—continued.		Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.	A. g.
	<i>Mr. G. H. Hampton, Assistant Superintendent, Deccan Revenue Survey—continued.</i>										
66	Kalvan (Rameshvar).	Rice (Kamod), 18th February 1895.	16	1,800	...	1,523 in husk	...	43 5 9	7 0 3 O. S.	13.47	0 4
	<i>Mr. Ichharām Bhagvándás, Ag. Superintendent, L. R. and Agriculture, C. D.</i>										
67	Málegaon (Málegaon).	Linseed (Javas), 8th February 1895.	16	400	9	207 Seed.	...	12 8 5	1 5 0 O. S.	10.47	0 8
68	Do. (do.)	Do. (do.)	20	500	8½	297 Seed.	...	17 14 8	1 11 6 O. S.	9.59	0 8
69	Do. (do.)	Gram, 8th February 1895.	14	400	59	215	150	6 13 .2	1 13 8 O. S.	27.17	0 8
70	Do. (do.)	Do. ...	16	480	64	175	150	5 10 0	1 14 2 O. S.	33.51	0 8
	AHMADNAGAR.										
	<i>Mr. V. B. Vadekar, District Deputy Collector.</i>										
71	Kopargaon (Gondhavi).	Spiked millet (Báji), 18th November 1894.	13	415	8	314	676	8 7 1	0 11 2 R. S.	8.26	0 6
72	Do. (do.)	Do. (do.)	11	270	8	198	415	5 6 4	0 7 0 R. S.	8.10	0 6
73	Do. (do.)	Do. (do.)	8	140	8	136	410	3 15 .3	0 6 8 R. S.	10.54	0 6
	POONA.										
	<i>Mr. H. W. J. Bagnell, Assistant Collector.</i>										
74	Mával (Vadgaon) ...	Rice (Sál), 17th November 1894.	16	1,200	64	1,170 in husk.	1,720	20 2 6	2 0 3 R. S.	10.00	0 4

Central Division, 1894-95—continued.

R. S.—Revision Survey.

Equivalent in Tolas of local measure Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
	Principal Product.	By- Product.	
13	14	15	16
Tolas.	Lbs.	Cwts.	
105	35	...	<i>Experiment No. 66.</i> —Same crop on somewhat deeper soil, growing the same crops every year. Sugarcane in the previous year liberally manured, and its residue must have had some effect on the test crop. Other conditions same as above. Yield compared to the formulæ 14 annas.
123	16½	...	<i>Experiment No. 67.</i> —Linseed on <i>káli bhurat</i> , light black soil manured with about ten carts of town sweepings per acre. Rotation:—(1) <i>til</i> and <i>kulith</i> , (2) <i>rabi jowári</i> and (3) <i>kharif jowári</i> . Season favourable and tillage careful. Outturn compared to the formulæ 11 annas.
123	16½	...	<i>Experiment No. 68.</i> —Linseed on similar but somewhat superior land manured liberally with about 20 carts of the above manure. Rotation:—(1) cotton and <i>til</i> , (2) cotton and <i>bájrí</i> and (3) cotton and linseed. Season, &c., as above. Crop represents a 13-anna formulæ outturn.
143	33	1	<i>Experiment No. 69.</i> —Gram as a second crop after <i>bájrí</i> on similar but a more highly assessed field growing during the last three years:—(1) <i>bájrí</i> , (2) <i>shálu jowári</i> and linseed and (3) cotton. Field manured for the first crop with about 10 carts per acre of municipal refuse. Season, &c., as above. Seed-rate in this and the following test more than double the formulæ standard. Crop poor, being only 11 annas of the formulæ. Incidence on second crop alone.
143	33	1	<i>Experiment No. 70.</i> —Gram as a second crop after <i>bájrí</i> on similar but a more highly assessed field. Rotation:—(1) <i>bájrí</i> , (2) <i>bájrí</i> with mixtures and (3) cotton and <i>bájrí</i> . Compared with the formulæ crop 10 annas. Incidence calculated on second crop only.
115	41½	10½	<i>Experiment No. 71.</i> — <i>Bájrí</i> with a sprinkling of <i>tur</i> and <i>ambádi</i> on unmanured reddish brown soil. The same mixed crop is generally grown, <i>jowári</i> being occasionally taken. Season reported to be favourable, though the crop must have suffered somewhat from the long break in August. Tillage careful.
116	41½	7½	<i>Experiment No. 72.</i> —Same crop on inferior <i>barad</i> or hard brown soil, growing unmanured <i>bájrí</i> and <i>jowári</i> in alternate years. Other conditions as above.
114	40½	2	<i>Experiment No. 73.</i> —Same crop on similar land. Rotation:—(1) and (2) <i>bájrí</i> , (3) <i>jowári</i> and (4) <i>bájrí</i> . Tillage indifferent. Season, &c., as above.
78	64	8½	<i>Experiment No. 74.</i> —Inferior rice, <i>sál</i> , on <i>gadhi</i> land, growing the same crop every year followed by a second crop of gram in years of favourable rainfall. Seed-bed manured as usual with cowdung, but not the field. Proportionate area of seed-bed to acre of transplantation not ascertained. Season favourable, but cultivation indifferent, weeding being neglected. Sample 2½-tolas short of the recorded weight. Seed-rate very high, the corresponding formulæ rate being only 33 lbs.

Summary of Crop Experiment Reports,

O. S. = Original Survey ;

No.	District, Taluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formula.	AVERAGE PER ACRE.						Area of Test.
					Seed.	Yield of		Total Value of Produce.	Assessment, excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.	
						Principal Product.	By-Product.				
1	2	3	4	5	6	7	8	9	10	11	12
	POONA—continued.		Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.	A. g.
	<i>Mr. H. W. J. Bagnell,</i> <i>Assistant Collector.</i> —continued.										
75	Mával (Vadgaon)...	Eleusine coracana (Nágli or Rági), 17th November 1894.	16	1,200	20	942	1,025	19 14 4	0 6 2 R. S.	1.93	0 8
76	Haveli (Loni Kálbhar). <i>Mr. A. S. A. Westropp,</i> <i>Assistant Collector.</i>	Spiked millet (Bájri), 7th November 1894.	12	400	6½	522	1,220	15 15 7	1 6 2 R. S.	8.67	0 8
77	Purandhar (Pur) ...	Eleusine coracana (Nágli or Rági).	18	1,170	4½	1,309	20 bundles.	27 14 11	0 7 0 R. S.	1.56	0 8
78	Bhimthadi (Vásunde). <i>Mr. J. W. Mollison,</i> <i>Superintendent of Farms.</i>	Great millet (Jowári) and Safflower (Kardai). ...	11	410	4 ¹¹ / ₁₃	104	300 bundles.	5 7 11	} 0 7 11 R. S.	7.01	0 8
			11	40	1 ⁹ / ₁₀	89	...	1 9 0			
								7 0 11			
79	Khed (Chákan) ...	Red Onions (Kánde), 5th May 1895.	18	9,000	8.9 sers.	35,022	...	235 0 0	2 9 0 R. S.	1.09	0 4.5
80	Do. (do.) ...	Do. (do.) ...	14	7,000	8.9 sers.	19,228	...	128 5 5	2 13 9 R. S.	2.22	0 4.3
81	Do. (do.) ... SHOBA PUR. <i>Mr. B. C. H. C. Kennedy,</i> <i>Assistant Collector.</i>	Do. (do.), 6th May 1895.	18	9,000	8.9 sers.	34,514	...	228 0 7	4 1 10 R. S.	1.97	0 3.5
82	Karmála (Rople) ...	Groundnut, 14th and 15th February 1895.	11	1,500	106	2,358 in shell.	2,000	66 1 11	1 7 11 R. S.	2.27	0 5

Central Division, 1894-95—continued.

R. S. = Revision Survey.

Equivalent in Tolas of local measure Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
	Principal Product.	By- Product.	
13	14	15	16
Tolas.	Lbs.	Cwts.	
85	52½	4½	Experiment No. 75.— <i>Nāgli</i> or <i>rāgi</i> on <i>mālvarkas</i> land, growing without manure, one crop of <i>tīl</i> followed by 3 of <i>rāgi</i> after a year's rest. Seed-bed rābed with cowdung and grass but its proportion to area of field not reported. Season as above. Tillage good. Seed rate more than double the formulæ rate and outturn 14 annas compared to the same standard.
94½	37	5½	Experiment No. 76.— <i>Bājri</i> unmanured on <i>khārvat chopan</i> soil, growing mostly <i>bājri</i> but occasionally <i>jowāri</i> . Field lay fallow in 1892-93. Rainfall sufficient and seasonable but cultivation indifferent. Crop 14 annas according to the formulæ.
88	58½	4 bundles.	Experiment No. 77.— <i>Nāgli</i> or <i>rāgi</i> unmanured on light friable sloping soil, <i>mulshi</i> , and growing (1) <i>nāgli</i> and (2) <i>sāva</i> and niger. The test crop was the second <i>nāgli</i> crop after fallow, the first one having yielded poorly. Seed was at first sown in a rābed seed-bed the proportionate area of which per acre of field not ascertained. Season favourable at first but later rains deficient. Tillage careful. Seed rate low. Outturn maximum according to the formulæ.
90	41½	100 bundles.	Experiment No. 78.— <i>Jowāri</i> mixed with <i>kardai</i> on stony black soil growing without manure 3 crops of <i>jowāri</i> followed by one of <i>bājri</i> . Season, &c., as above; cloudy weather late in the season further injured the cereal. Three rows of <i>kardai</i> alternated with 21 of <i>jowāri</i> .
70	57½	...	
80 weight.	149	...	Experiment No. 79.—Onions on mixed black soil field growing ordinarily <i>bājri</i> and onions in one year followed by groundnuts in the second. Groundnut was grown at first. It failed owing to heavy rain and <i>bājri</i> was substituted for it which also was a failure. The test crop top dressed with about 17 carts per acre of ordinary manure and watered 9 times from a well in the field. About 4 guntha seed-bed furnished seedlings for an acre of field. A sample kept by the experimenter lost 11 per cent. in dryage in 18 days. This is allowed for in the reported outturn. Season good and cultivation excellent. Crop 3½ times the formulæ maximum standard.
80 weight.	150	...	Experiment No. 80.—Onions on lighter soil under similar rotation. Crop manured with about 23 carts per acre of ordinary manure and irrigated 4 times a month. Season as above; tillage good. Crop affected by shade of trees which reduced outturn, which is however nearly double the maximum crop of the formulæ.
Do.	151	...	Experiment No. 81.—Same crop on similar land which grew during the last three years (1) groundnut, (2) sugarcane and (3) <i>bājri</i> followed by onions. Crop manured with about 18 carts per acre of farm yard manure and watered three times a month from a well and also by channel from a bunded stream which failed in the hot weather. Area of seed-bed ⅓ of that of the field. Season as above. Cultivation very careful.
80	37½	4½	Experiment No. 82.—Groundnut on mixed brown soil manured with 30 cart-loads of farm yard manure and town sweepings. Field grew during the previous three years (1) maize (2) onions and (3) spelt wheat. Crop irrigated regularly once a week from a one not well in the field. It was weeded thrice but at date of experiment it was overgrown with grass. Season not favourable and tillage bad. Seed rate high. Outturn poor. Figures in column 7 are for unshelled nuts. The experimenter forwarded a test ser of kernels which weighed 12 tolas short of the recorded weight.

Summary of Crop Experiment Reports,

O. S. = Original Survey ;

No.	District, Taluka, Village and Experimenter.	Crop and Date of Experiment.	Local Esti- mate in Annas.	Yield accord- ing to For- mulae.	AVERAGE PER ACRE.							Area of Test.
					Seed.	Yield of		Total Value of Produce.	Assess- ment, excluding Local Funds.	Incidence of Assess- ment on the Value of Gross Produce.		
						Princi- pal Product.	By- Product.					
1	2	3	4	5	6	7	8	9	10	11	12	
	SHOLA'PUR —continued. <i>Mr. B. O. H. C. Kennedy, Assistant Collector—continued.</i>		Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.	A. g.	
83	Bársi (Kándalgaon).	Gram, 5th De- cember 1894.	8	130	30	294	...	6 9 4	1 0 11 R. S.	16.06	0 5	
	<i>Mr. G. Scott, District Deputy Collector.</i>											
84	Sángola (Sángola)...	Rice (Sál), 22nd November 1894.	12	750	61	760 in husk.	2,017	19 15 6	0 14 8 R. S.	4.59	0 4	
85	Do. (Javhále) ...	Gram, 12th February 1895.	12	300	75	1,131	...	25 0 0	0 15 5 R. S.	3.85	0 4	
	SATARA. <i>Mr. W. C. Rand, Assistant Collector.</i>											
86	Sátára (Tásgaon) ...	Do. (do).	14	470	83	264	...	7 6 3	3 1 2 R. S.	41.57	0 8	
87	Do. (do.) ...	Do. (do.)	15	520	103	392	...	11 4 10	3 8 0 R. S.	30.97	0 8	
88	Koregaon (Kore- gaon).	Spelt wheat (Khapli or Jod), 4th March 1895.	20	1,800	170	929 in husk.	...	30 15 3	10 13 11 R. S.	35.71	0 4	
	<i>Mr. S. R. Arthur, Assistant Collector.</i>											
89	Karád (Mhopre) ...	Spiked millet (Báji), 13th November 1894.	12	400	15	299	452	11 6 6	0 7 8 O. S.	4.20	0 8	
90	Do. (Vasantgad).)	Rice, 12th November 1894.	14	1,000	31	524 in husk.	1,223	17 0 6	2 13 8 O. S.	16.75	0 4	

Central Division, 1894-95—continued.

R. S. = Revision Survey.

Equivalent in Tolas of local measure Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
	Principal Product.	By- Product.	
13	14	15	16
Tolas.	Lbs.	Cwts.	
$145\frac{2}{3}$	$44\frac{1}{2}$	...	<i>Experiment No. 83.</i> —Unirrigated and unmanured gram, sole crop on a medium black soil, which grew <i>jowári</i> during the two previous years. Season unfavourable owing to deficient rainfall. Cultivation bad; field overgrown with <i>tákla</i> weeds. Outturn valued at 8 annas only, but represents a 12-anna crop of the formulæ.
118	$46\frac{1}{3}$	5	<i>Experiment No. 84.</i> —Inferior rice, <i>sál</i> , on blackish brown dry-crop soil, locally called <i>marul</i> , liberally dressed with about 48 carts of farm yard manure per acre. Previous cropping not given, the experimenter simply remarking that it is undefined. The crop watered by rain water impounded by a newly built <i>tál</i> . Season average and tillage good. Seed rate high.
147	$45\frac{1}{4}$	...	<i>Experiment No. 85.</i> —Gram as a sole crop on a portion of a black soil field, which is classed as <i>bágáyat</i> . Maize followed by spelt wheat usually grown. This year gram sown as a change. Field manured at the rate of 30 carts farm yard manure per acre, and the crop reported to have been irrigated twice. Season favourable and tillage good. Seed rate very high. Outturn nearly double the maximum crop of the formulæ.
121	$35\frac{2}{3}$	...	<i>Experiment No. 86.</i> —Gram grown as a second crop on good black soil, growing <i>bájri</i> and <i>jowári</i> in alternate years, the former followed by gram. Field lightly manured for <i>bájri</i> with about 3 cart-loads per acre. Season not favourable owing to insufficient moisture. Tillage good. Seed rate very high. Crop 11 annas of the formulæ. Sample ser received in this office weighed 5 tolas short of the recorded weight. Incidence in this and the following two tests on second crops only.
$117\frac{1}{2}$	$34\frac{2}{3}$	...	<i>Experiment No. 87.</i> — Do. do. do. Outturn 13 annas according to the formulæ standard.
$111\frac{1}{2}$	30	...	<i>Experiment No. 88.</i> —Spelt wheat on blackish <i>bágáyat</i> land, which grew during the last three years (1) <i>rúla</i> and gram, (2) groundnut and (3) <i>bájri</i> and <i>khapli</i> wheat. <i>Bájri</i> , the first crop, was manured with about 18 carts per acre of cowdung. <i>Khapli</i> wheat irrigated once a fortnight from a <i>pút</i> . Season favourable and tillage good. Crop 12 annas according to the formulæ standard, though classed as maximum. Seed rate very high.
111	34	$1\frac{1}{2}$	<i>Experiment No. 89.</i> — <i>Bájri</i> on light <i>mál</i> soil manured with folding sheep. Field grows <i>bájri</i> and <i>jowári</i> in alternate years. Season favourable and tillage careful. Seed rate high.
88	36	$4\frac{1}{2}$	<i>Experiment No. 90.</i> —Rice on salt, <i>khár</i> , land manured with 11 carts per acre of cowdung, growing rice every year followed by a second crop of gram only in years of favourable rainfall. Season unfavourable owing to want of timely rain but tillage careful. Seed rate low. Outturn poor, being only 11 annas compared to the formulæ standard.

Summary of Crop Experiment Reports,

O. S. = Original Survey;

1	District, Táluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formula.	AVERAGE PER ACRE.						Area of Test.
					Seed.	Yield of		Total Value of Produce.	Assessment, excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.	
						Principal Product.	By-Product.				
1	2	3	4	5	6	7	8	9	10	11	12
	SA'TA'RA—contd.		Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.	A. g.
	Mr. S. B. Arthur, Assistant Collector —continued.										
91	Karád (Vasantgad). Mr. J. M. Cursetji, District Deputy Collector.	Eleusine coracana (Nágli), 16th November 1894.	12	750	27	1,513	2,653	32 8 3	0 9 6 O. S.	1.80	0 8
92	Khatáv (Vákeshvar).	Wheat, 13th January 1895.	16	800	33	381	...	11 10 6	1 9 4 R. S.	13.58	0 10
93	Do. (Pusesávli).	Gram, 19th January 1895.	11	270	47	241	256	6 12 11	1 11 0 R. S.	24.77	0 10

Central Division, 1894-95—concluded.

R. S. ⇒ Revision Survey.

Equivalent in Tolas of local measure Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
	Principal Product.	By- Product.	
13	14	15	16
Tolas.	Lbs.	Cwts.	
112	56½	3¾	<i>Experiment No. 91.</i> —Nagli on light reddish soil manured with six carts per acre of cowdung and growing the same crop every year. Season favourable and tillage good. Seed rate very high. Outturn full maximum of the formulæ standard. By-product valued very high at Rs. 6 per acre.
111	32½ ₁₀	...	<i>Experiment No. 92.</i> —Unmanured and unirrigated wheat on medium black soil, growing wheat and gram with a sprinkling of safflower every year. Late rains were favourable and hence season was fair. Tillage fair. Outturn 1½ annas of the formulæ standard. By-product not valued at all, though useful as fodder.
115	38½	4½	<i>Experiment No. 93.</i> —Gram on similar soil, growing without manure <i>jowari</i> , wheat, gram and <i>bājri</i> on different portions of the field and lately also garden crops with the assistance of a newly constructed <i>budki</i> . Season reported not to be favourable, and tillage very indifferent. Seed rate double the formulæ rate. Incidence high, owing apparently to poor crop.

Summary of Crop Experiment Reports,

O. S. =Original Survey;

No.	District, Taluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formulae.	AVERAGE PER ACRE.						Area of Test.
					Seed.	Yield of		Total Value of Produce.	Assessment, excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.	
						Principal Product.	By-Product.				
1	2	3	4	5	6	7	8	9	10	11	12
	BELGAUM.		Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.	A. g.
	<i>Mr. C. C. Boyd,</i> <i>Assistant Collector.</i>										
94	Gokák (Vaderhatti).	Spiked millet (Báji), 29th November 1894.	15	600	2	454	555	12 8 11	0 2 1 R. S.	1.03	0 8
95	Do. (do.)...	Great millet (Jowári), 29th November 1894.	18	1,260	3	664	810	19 14 5	0 2 1 R. S.	0.65	0 8
96	Do. (Mudalgi).	Do. (do.), 12th January 1895.	6	175	3½	126	590	8 3 6	1 4 9 R. S.	15.77	0 8
	<i>Mr. L. C. Swifte,</i> <i>Assistant Collector.</i>										
97	Parasgad (Saundatti).	Wheat, 25th January 1895.	12	500	25	425	4 bundles.	12 9 7	1 12 8 R. S.	14.22	0 10
	<i>Mr. N. G. Deshpánde,</i> <i>District Deputy Collector.</i>										
98	Chikodi (Hukeri) ...	Great millet (Khab-shed-gár Jowári), 10th December 1894.	20	1,400	7½	1,316	4,024	44 15 11	1 15 3 R. S.	4.34	0 10
99	Do. (do.) ...	Do. (Gidgid-gemp Jowári), 10th December 1894.	20	1,400	13	1,486	3,092	47 9 6	1 15 3 R. S.	4.10	0 20
100	Do. (Jábápur)...	Do. (Gund Jowári), 9th December 1894.	20	1,400	4	556	796	19 1 10	0 13 1 R. S.	4.27	0 10
101	Do. (do.) ...	Do. (Shedgár), 9th December 1894.	20	1,400	8½	819	1,072	26 12 9	0 13 1 R. S.	3.05	0 10
102	Do. (do.) ...	Do. (Gund Jowári), 9th December 1894.	20	1,400	25	244	588	9 1 7	0 8 3 R. S.	5.66	0 20
	BIJAPUR.										
	<i>Mr. H. Page,</i> <i>Assistant Collector.</i>										
103	Bágevádi (Mulrád)	Spiked millet (Báji), 17th November 1894.	8	160	4	331	436	6 12 4	0 3 1 R. S.	2.84	0 10

Southern Division, 1894-95.

R. S.=Revision Survey.

Equivalent in Tolas of local measure Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
	Principal Product.	By- Product.	
13	14	15	16
Tolas.	Lbs.	Cwts.	
85	48 $\frac{1}{2}$	1 $\frac{1}{2}$	Experiment No. 94.— <i>Bājri</i> on hard red stony land, manured with 7 or 8 carts of cattle dung and sweepings every other year and growing <i>jowāri</i> and <i>bājri</i> alternately. Season very fair. Rain for sowing came very late and that at end of season was deficient. Tillage not careful. Seed rate low. Crop 12 annas according to the formulæ.
81	47 $\frac{1}{2}$	1 $\frac{1}{2}$	Experiment No. 95.—Kharif <i>jowāri</i> on similar but more liberally manured land growing <i>jowāri</i> and castor seed in alternate years. Season as above. Tillage careful. Crop 12 annas.
80 $\frac{1}{2}$	41 $\frac{1}{2}$	1	Experiment No. 96.—Rabi <i>jowāri</i> on unmanured rich black soil growing kharif and rabi <i>jowāri</i> in alternate years. Season bad, rain being scanty both at seed time and later on. Tillage indifferent. Crop poor.
82	40 $\frac{1}{2}$	1 $\frac{1}{2}$ bundles.	Experiment No. 97.—Dry-crop wheat with a sprinkling of safflower on hard black soil, lightly dressed with about 3 carts of cattle dung and ashes per acre, and growing (1) wheat, (2) cotton and (3) <i>jowāri</i> in succession. Season somewhat unfavourable, the crop having suffered from want of moisture, and also it is said from west winds. Seed rate below average. Yield in column 7 exclusive of the subordinate crop which occupied about $\frac{1}{9}$ of the total area and which was not tested.
85	40 $\frac{1}{2}$	2 $\frac{1}{2}$	Experiment No. 98.—Kharif <i>jowāri</i> , <i>Khab-shedgār</i> , on black soil, manured with 6 carts of ordinary manure and by folding sheep. Cotton was grown in the previous year. Season favourable and tillage careful. <i>Tur</i> sown mixed with <i>jowāri</i> in every sixth row. Subordinate crops not tested in this and the following 4 tests.
85 $\frac{1}{2}$	41	2	Experiment No. 99.— <i>Gidgidemp</i> , another variety of <i>jowāri</i> , grown on another part of the above field. 16 carts of ordinary manure applied to this portion which grew heavily manured chillies during the previous 2 seasons. Season, &c., as above. Here every 4th row was mixed with <i>tur</i> . Sample ser fell short of the recorded weight by 4 tolas.
84 $\frac{3}{4}$	40 $\frac{1}{5}$	1 $\frac{1}{2}$	Experiment No. 100.— <i>Gund jowāri</i> with <i>kulthi</i> in every 4th row on a good reddish soil mixed with small stones and lightly dressed with 4 carts of manure. Other conditions as above. Crop 11 annas according to the formulæ standard.
85	40 $\frac{1}{2}$	1 $\frac{1}{2}$	Experiment No. 101.— <i>Shedgār jowāri</i> on another part of the above field which received no manure for the test crop, but was dressed liberally for chillies grown in the previous year. <i>Tur</i> and <i>jowāri</i> were mixed before sowing. Season, &c., as above. Crop compared to the formulæ 13 annas.
83 $\frac{1}{2}$	39 $\frac{4}{5}$	1 $\frac{5}{8}$	Experiment No. 102.— <i>Gund jowāri</i> on reddish <i>mardi</i> land, growing without manure, (1) <i>rāla</i> and <i>bājri</i> , (2) and (3) <i>jowāri</i> , (4) <i>rāla</i> and <i>bājri</i> . <i>Tur</i> and <i>kulthi</i> were the subordinate crops this year. Season, &c., as above. Seed rate very high. Crop poor being only 7 annas according to the formulæ.
149 $\frac{1}{4}$	53 $\frac{3}{4}$	6 $\frac{1}{5}$	Experiment No. 103.— <i>Bājri</i> with every fifth row alternately of <i>kulthi</i> and <i>tur</i> on inferior black soil, <i>mardi</i> , manured for the first time with about 3 carts of farmyard manure and growing early and late <i>jowāri</i> and also <i>bājri</i> each with subordinate mixtures. Season fair; tillage good. Outturn exclusive of the subordinate pulses which were not tested.

Summary of Crop Experiment Reports,

O.S. = Original Survey;

No.	District, Taluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formula.	AVERAGE PER ACRE.						Area of Test.
					Seed.	Yield of		Total Value of Produce.	Assessment, excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.	
						Principal Product.	By-Product.				
1	2	3	4	5	6	7.	8	9	10	11	12
BIJA'PUR—contd.											
	<i>Mr. R. C. Artal, District Deputy Collector.</i>		Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.	A. g.
104	Bijapur (Navaras-pur).	Spiked millet (Bajri), 14th November 1894.	16	640	4½	426	996	9 7 3	0 2 0 R. S.	1.32	0 10
105	Do. (Bijapur) ...	Do. (do.), 15th November 1894.	16	640	4½	519	1,081	11 7 9	0 7 4 R. S.	3.99	0 10
106	Sindgi (Sindgi) ...	Great millet (Bile Jol Jowari), 18th February 1895.	14	800	3½	681	1,701	15 8 0	0 15 3 R. S.	6.14	0.10
DHA'RWAR.											
	<i>Mr. B. Knight, Assistant Collector.</i>										
107	Hubli (Anchatgeri) ...	Eleusine coracana (Ragi), 5th December 1894.	12	500	5½	966	935	13 13 0	0 14 9 R. S.	5.68	0 8
	<i>Mr. L. O. Swift, Assistant Collector.</i>										
108	Ranebennur (Chalgeri).	Do. (do.), 2nd December 1893.	10	250	4½	815	1,474	13 12 0	0 12 5 R. S.	5.64	0 10
	<i>Mr. F. G. H. Anderson, Assistant Collector.</i>										
109	Karajgi (Neglur) ...	Italian millet (Navani), 2nd December 1894.	11	270	6½	843	2,631	11 13 0	0 8 8 R. S.	4.58	1 0
	<i>Mr. K. N. Bhargoonkar, District Deputy Collector.</i>										
110	Gadag (Hesrur) ...	Eleusine coracana (Ragi), 5th December 1894.	10	250	3	1,023	181 chaff.	19 4 11	0 12 10 R. S.	4.15	0 10
111	Navalgund (Morab) ..	Gram, 6th February 1895.	8	140	21½	242	143 chaff.	7 10 7	1 9 5 R. S.	20.73	0 14

Southern Division, 1894-95—continued.

R. S. = Revision Survey.

Equivalent in Tolas of local measure Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
	Principal Product.	By- Product.	
13	14	15	16
Tolas.	Lbs.	Cwts.	
148½	51½	8	<i>Experiment No. 104.</i> — <i>Bājri</i> with a mixture of <i>math</i> in every sixth row on poor sandy loam soil growing without manure <i>bājri</i> and late <i>jowāri</i> each with subordinate pulses. A large portion of the field lies waste for grass every year. Season somewhat late but good on the whole. Tillage fair. Outturn exclusive of the untested subordinate pulse and represents a 12-anna crop of the formulæ. Sample ser received in this office weighed 4 tolas short of the reported weight.
146½	50½	8	<i>Experiment No. 105.</i> —Same crop with a mixture of <i>tur</i> and sprinkling of <i>ambādi</i> and <i>mug</i> on similar but somewhat superior soil growing late <i>jowāri</i> and <i>bājri</i> in alternate years. Season, &c., as above. Subordinate crops not tested. Outturn compared to the formulæ 14 annas. Sample weighed 143 tolas only.
157½	54½	5	<i>Experiment No. 106.</i> —Late <i>jowāri</i> , <i>bile jol</i> , on fair black soil growing during the past 4 years, (1) cotton, (2) and (3) late <i>jowāri</i> and (4) linseed and wheat. Field last manured four years ago with about 6 carts per acre. Season favourable. Tillage fair. Field weeded four times, yet was full of <i>hariāli</i> . Seed rate low. Crop about 13 annas according to the formulæ standard.
146	75	8½	<i>Experiment No. 107.</i> — <i>Rāgi</i> on red <i>masāri</i> soil lightly manured three years ago with ordinary manure. Rotation undefined. That during last three years was (1) <i>rāgi</i> , <i>navani</i> , <i>sāva</i> , <i>kulthi</i> and <i>bājri</i> , (2) <i>jowāri</i> and (3) <i>rāgi</i> , <i>kulthi</i> , <i>tur</i> and <i>sāva</i> . Season unfavourable owing to insufficient rainfall. Tillage fair. Crop above average of the locality and 19 annas compared to the formulæ. Sample received in this office gave an excess of 4 tolas.
135½	83½	3½	<i>Experiment No. 108.</i> — <i>Rāgi</i> with <i>jowāri</i> in every fifth row on red <i>masāri</i> soil manured with about 12 carts per acre of ordinary manure and growing usually <i>jowāri</i> , <i>navani</i> and <i>rāgi</i> in succession. Season fair and tillage good. Outturn exclusive of the subordinate crop. No sample ser received in this office as required by standing orders. The experiment was carried out in the previous season, but received too late for inclusion in last year's report.
170	79½	19½	<i>Experiment No. 109.</i> —Italian millet, <i>navani</i> , on a reddish black sandy soil, <i>galwari</i> , growing without fixed rotation <i>jowāri</i> , <i>navani</i> , and cotton. Field manured with about 9 carts of farm-yard manure and stable litter. Season somewhat unfavourable; rain ceased early and some of the plants dried off. Outturn, however, more than bumper of the formulæ though valued at 11 annas only. Sample ser received in this office gave a deficiency of 24 tolas. Hence figures doubtful.
142½	65½	2½	<i>Experiment No. 110.</i> — <i>Rāgi</i> on white <i>masāri</i> soil growing <i>jowāri</i> and <i>rāgi</i> in alternate years. Part of the field manured every year with about 15 carts of cattle dung and sweepings per acre, the manuring of the whole being completed in 5 years. The tested portion manured in 1893. Season unfavourable, crop having suffered from long break in August and September. Tillage careful and outturn quite satisfactory. Sample ser weighed 145½ tolas in this office.
151½	38	1½ chaff.	<i>Experiment No. 111.</i> —Gram on rich black soil lightly dressed with ordinary manure and growing wheat, cotton, gram and <i>jowāri</i> in no definite rotation. Season unfavourable, rain being insufficient and unseasonable. Safflower occupied every seventh row, but it was not tested and the outturn is exclusive of the oilseed. Crop 11 annas of the formulæ. Sample ser gave an excess of 4 tolas in this office.

Summary of Crop Experiment Reports,

O. S.=Original Survey;

No.	District, Taluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formulae.	AVERAGE PER ACRE.						Area of Test.
					Seed.	Yield of		Total Value of Produce.	Assessment, excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.	
						Principal Product	By-Product.				
1	2	3	4	5	6	7	8	9	10	11	12
	KOLA'BA.		Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.	A. g.
	<i>Mr. O. G. H. Fawcett, Assistant Collector.</i>										
112	Karjat (Mamdápur).	Eleusine coracana (early Nágli), 31st October 1894.	16 to 18	800 to 900	22½	1,384	...	26 12 4	0 4 3 R. S.	0.99	0 4
113	Do. (do.) ...	Panicum miliare (Halvi or early Vari), 31st October 1894.	16 to 18	800 to 900	26½	974	...	15 9 2	0 4 3 R. S.	1.70	0 4
114	Do. (Neral) ...	Niger-seed, 31st October 1894.	16 to 18	400 to 450	13½	204 seed.	...	9 6 0	0 5 4 R. S.	3.55	0 4
	<i>Mr. H. O. W. G. Brooke, Assistant Collector.</i>										
115	Karjat (Karjat) ...	Gram ...	12	250	70 to 80	827	...	27 13 0	4 14 5 R. S.	17.62	0 8
116	Do. (Tupgaon) ...	Large fruited dolichos, (Kadve Vál).	12	200	24	933	20 baskets.	20 12 0	6 6 5 R. S.	30.85	0 8
	<i>Mr. R. E. Kanga, District Deputy Collector.</i>										
117	Mángaon (Bhadáv) .	Gram, 9th March 1895.	12	200	80	267	...	9 4 7	0 15 3 O. S.	10.26	0 8
118	Do. (Bámnoli) ...	Do. 10th March 1895.	16	320	157	397	...	13 9 1	0 13 5 O. S.	6.18	0 8
119	Do. (Nilghun) ...	Do. ...	10	125	117	210	...	7 2 3	0 14 0 O. S.	12.25	0 8
	<i>Mr. W. S. Cole, Assistant Settlement Officer, Konkan Revenue Survey.</i>										
120	Mángaon (Utekhol) .	Rice (Panvel), 15th November 1894.	18	2,250	20 to 30	1,593 in husk.	2,160	32 3 0	3 2 2 O. S.	9.71	0 2

Southern Division, 1894-95—continued.

R. S.= Revision Survey.

Equivalent in Tolas of local measure Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
	Principal Product.	By- Product.	
13	14	15	16
Tolas.	Lbs.	Cwts.	
63	57 $\frac{3}{4}$	...	<i>Experiment No. 112.</i> — <i>Nágli</i> on stony shallow <i>varhas</i> sloping soil, growing (1) <i>nágli</i> and (2) <i>vari</i> after two years' fallow. Seed at first sown in a rábed seed-bed, the proportionate area of which for an acre of field is reported at about 6 gunthas. Seed-rate high. Season good, but heavy rain at end of season lodged some of the crop. Tillage ordinary. Outturn very satisfactory.
61	62 $\frac{1}{2}$	...	<i>Experiment No. 113.</i> — <i>Vari</i> on another part of the above field. Area of seed-bed for an acre of transplantation reported at 2 $\frac{2}{15}$ gunthas. Other conditions same as above. Sample ser weighed 3 tolas short in this office.
53	21 $\frac{3}{4}$	...	<i>Experiment No. 114.</i> —Niger-seed on similar, but less stony and more level, unmanured soil, growing (1) <i>nágli</i> , (2) niger-seed after two-years' fallow. Season, &c., as above. Seed-rate high. Crop 11 annas according to the formulæ.
72 $\frac{1}{2}$	29 $\frac{3}{4}$	...	<i>Experiment No. 115.</i> —Unmanured gram as a second crop on <i>chikanvat</i> moisture holding soil near the bed of a river, growing in each of the last three years rice followed by gram. Crop suffered slightly from excessive rain at end of season. Tillage ordinary. Seed-rate high. Outturn more than 1 $\frac{1}{2}$ times the yield recorded for a maximum crop in the formulæ. Incidence on second crop alone.
77	46 $\frac{1}{2}$	26 baskets.	<i>Experiment No. 116.</i> — <i>Vál</i> on fairly deep good soil, growing without manure rice every year followed by a second crop of <i>vál</i> only in years of ample late rains. Season very favourable and tillage fair. Outturn more than double the maximum crop of the formulæ standard. Incidence on second crop only.
80	28 $\frac{3}{4}$	...	<i>Experiment No. 117.</i> —Gram on <i>malkhandi rabi</i> land, growing without manure the same crop every year. Season favourable; tillage good. Seed-rate high. Crop 14 annas according to the formulæ. Sample sers received from this officer in connection with this and the two following tests gave an excess of about 4 tolas in each case.
81 $\frac{1}{2}$	29 $\frac{1}{4}$	...	<i>Experiment No. 118.</i> —Same crop on similar soil manured by sheep folding, and growing gram and <i>vál</i> in alternate years. Season, &c., as above. Seed-rate very high. Yield full maximum.
82	29 $\frac{3}{4}$	...	<i>Experiment No. 119.</i> —Same crop on similar soil without manure. Gram and <i>mug</i> grown alternately. Other conditions as above. Crop 12 annas.
56 $\frac{1}{2}$	61 $\frac{3}{4}$	3 $\frac{1}{4}$	<i>Experiment No. 120.</i> —Rice, <i>Panvel</i> , on dark brown soil, growing the same crop every year without manure and without any second crop. Seed sown in a rábed seed-bed, but its proportionate area to that of field not ascertained. Season favourable and tillage good. Area of test below the prescribed minimum in this and the following two tests. Samples of local measure sers not forwarded by the experimenter as required by standing orders.

Summary of Crop Experiment Reports,

• O. S. = Original Survey ;

No.	District, Taluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formula.	AVERAGE PER ACRE.							Area of Test.
					Seed.	Yield of		Total Value of Produce.	Assessment, excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.		
						Principal Product.	By-Product.					
1	2	3	4	5	6	7	8	9	10	11	12	
	KOLA'BA—contd.		Annas	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.	A. g.	
	<i>Mr. W. S. Cole, Assistant Settlement Officer, Konkan Revenue Survey—continued.</i>											
121	Māngaon (Khāndād).	Rice (Ghosāl), 16th November 1894.	18	2,250	20 to 30	2,100 in husk.	5,420	49 9 4	3 12 9 O. S.	7.67	0 2	
122	Do. (do.) ...	Do. (Hartāl), 17th November 1894.	18	2,250	20 to 30	1,890 in husk.	3,880	38 10 4	4 1 1 O. S.	10.84	0 2	
	<i>Mr. W. D. Wilkins, Assistant Superintendent, Konkan Revenue Survey.</i>											
123	Mahād (Chāmbhār-khind).	Do. (Mndaga), 16th November 1894.	14	2,010	48	2,147 in husk.	2,256	47 13 10	7 13 6 O. S.	16.38	0 4	
124	Do. (do.) ...	Do. (do) ...	14	2,010	48	1,437 in husk.	1,500	32 4 8	7 13 6 O. S.	24.29	0 4	
	<i>Mr. J. A. McIver, Assistant Superintendent, Konkan Revenue Survey.</i>											
125	Roha (Chāvre) ...	Do (Kinjal), 19th November 1894.	16	2,400	55	2,079 in husk.	3,056	44 3 7	3 10 5 O. S.	8.25	0 5	
	RATNA'GIRI.											
	<i>Mr. V. R. Kelkar, District Deputy Collector.</i>											
126	Deogad (Darum) ...	Do. (Sonphal or Sarvat), 15th October 1894.	5	95	61½	254 in husk.	506	5 14 1	0 4 0 O. S.	4.25	0 4	
127	Do. (Ozram) ...	Panicum malia-ceum (Barag), 19th October 1894	9	205	29¼	676	...	10 10 1	0 4 0 O. S.	2.35	0 8	
128	Do. (Kankavli) ...	Niger-seed, 2nd November 1894.	6	65	6½	169 seed.	1	5 7 10	0 8 0 O. S.	9.10	0 8	

Southern Division, 1894-95—continued.

R. S. = Revision Survey.

Equivalent in Tolas of local measure Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS
	Principal Product.	By- Product.	
13	14	15	16
Tolas.	Lbs.	Cwts.	
52½	57	3½	Experiment No. 121.—Rice, <i>ghosál</i> , on reddish brown, <i>rakat</i> soil. Other conditions as above.
58½	64	3½	Experiment No. 122.—Rice, <i>hartal</i> , on a little better soil than in Experiment No. 120. Other remarks as above.
60¼	53	2¼	Experiment No. 123.—Rice, <i>mudaga</i> , on reddish brown sandy soil growing without manure the same crop every year. Seed-bed <i>rábed</i> as usual with cowdung, grass, &c., but its quantity not noted. Season somewhat unfavourable; but tillage good. The test area selected from the seed-bed which occupied one-sixth of the area of field.
60¼	53	2¾	Experiment No. 124.—Same crop on another part of the same field which had not the advantage of the <i>ráb</i> . Other conditions as above. Crop 12 annas according to the formulæ standard.
58½	55½	4½	Experiment No. 125.—Rice, <i>kinjal</i> , grown annually without manure on fair alluvial soil which is however subject occasionally to being submerged with salt water at spring tides. Seed sown in a <i>rábed</i> seed-bed, 4½ gunthas of which gave seedlings sufficient for an acre of field. Some of the seedlings destroyed by heavy rain soon after plantation and a quantity of ungerminated seed had to be put in. Late rains were excessive and necessitated late reaping. Tillage good and outturn 15 annas of the formulæ.
33	45½	...	Experiment No. 126.— <i>Sarvat</i> or <i>sonphal</i> (red) rice on upland <i>varkas bhardi</i> land with soil only 3 or 4 inches deep, growing without manure (1) <i>barag</i> , (2) niger-seed and (3) rice or <i>harik</i> , after 8 years' fallow. Season favourable. Low outturn attributable to the test crop being the last in the rotation and to careless cultivation. Crop 10 annas according to the formulæ.
38½	63¾	...	Experiment No. 127.—Black <i>Barag</i> , 3rd crop in rotation on <i>bhardi varkas</i> land, growing, (1) <i>kulthi</i> , (2) <i>harik</i> , (3) <i>barag</i> , (4) niger-seed and (5) <i>sava</i> ; then land at rest for 7 years. / Season as above. Outturn represents a 17-anna crop of the formulæ.
50½	30½	...	Experiment No. 128.—Niger-seed on somewhat superior <i>varkas</i> land, growing unmanured (1) <i>barag</i> , (2) <i>harik</i> and (3) niger, followed by 4 years' fallow. - Season favourable, but outturn less than 11 annas, due apparently to the test crop being the last in rotation. Field weedy.

Summary of Crop Experiment Reports,

O. S. = Original Survey;

No.	District, Taluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formulae.	AVERAGE PER ACRE.						Area of Test.
					Seed.	Yield of		Total Value of Produce.	Assessment, excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.	
						Principal Product.	By-Product.				
1	2	3	4	5	6	7	8	9	10	11	12
	RATNA GIRI— <i>continued.</i> <i>Mr. V. R. Kelkar,</i> <i>District Deputy</i> <i>Collector—continued.</i>		Annas	Lbs.	Lbs.	Lbs.	Lbs.	Rs. p.	Rs. a. p.	Per cent.	A. g.
129	Deogad (Sávdao) ...	Eleusine coracana (Rági), 4th November 1894.	12	800	4 $\frac{3}{8}$	1,217	...	26 4 2	0 4 0 O. S.	0.95	0 8
130	Do. (Sángve) ...	Paspalum scrobiculatum (Harik), 11th November 1894.	8	160	15	714	...	6 12 11	0 4 5 O. S.	4.05	0 8
131	Do. (Bhirayde)...	Eleusine coracana (Rági), 11th November 1894.	12	800	5 $\frac{1}{2}$	1,129	...	26 1 10	0 2 0 O. S.	0.47	0 8
	KA'NARA. <i>Mr. N. R. Divátia,</i> <i>Assistant Collector.</i>										
132	Ankola (Kattinhokla).	Rice (Wommadu), 8th December 1894.	12	1,500	48	1,489 in husk.	6,482	26 11 2	2 8 0 O. S.	9.36	0 4
	 <i>Mr. J. McNeill,</i> <i>Assistant Collector.</i>										
133	Honávar (Hulegár)	Do. (Chitka), 26th March 1895.	16	...	308	960 in husk.	2,730 straw.	18 0 5	5 5 11 O. S.	30.07	0 4
134	Do. (do.)...	Do. (do.), 27th March 1895.	14	...	195	520 in husk.	2,040 straw.	9 15 4	5 0 0 O. S.	50.21	0 4

Southern Division, 1894-95—concluded.

R. S.= Revision Survey.

Equivalent in Tolas of local measure Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
	Principal Product.	By- Product.	
13	14	15	16
Tolas.	Lbs.	Cwts.	
56½	47	...	<i>Experiment No. 129.</i> — <i>Rági</i> , second crop in rotation, on slightly sloping <i>varkas</i> land, growing (1) <i>kulthi</i> , (2) <i>nágli</i> , (3) <i>harik</i> and (4) <i>niger</i> after six years' rest. Seed sown in a rábed seed-bed and seedlings after transplantation, top-dressed with fish manure. Season favourable. Tillage careful. Outturn full average according to formulæ.
51½	113	...	<i>Experiment No. 130.</i> — <i>Harik</i> , third crop, on gravelly <i>varkas</i> land, growing (1) <i>kulthi</i> , (2) <i>rági</i> , (3) <i>harik</i> and (4) <i>niger</i> -seed after rest for eight years. Field had been manured in the previous year for <i>rági</i> . Season, &c., as above. Crop 18 annas.
60½	43½	...	<i>Experiment No. 131.</i> — <i>Rági</i> on steep stony <i>varkas</i> land, growing this crop followed by <i>barag</i> and then land lying waste for 20 years. Seed as usual was sown on a rábed seed-bed and seedlings transplanted on land very lightly dressed with ashes and cowdung. Rainfall favourable and tillage good.
42½	62½	19¾	<i>Experiment No. 132.</i> —Inferior rice, <i>wommadlu</i> , on light brown soil manured with compost of cowdung, ashes, leaves and litter about 5 tons per acre, and growing the same crop during each of the past four years. Crop irrigated from an adjoining <i>nála</i> , water in which this year was deficient and could be used for ¾ field only. Seed sown in a seed-bed, 2½ gunthas of which furnished seedlings for an acre of field. Season fair. Rain being deficient in the latter part of the monsoon, outturn moderate.
26½	58½	13¾ straw.	<i>Experiment No. 133.</i> — <i>Vaingan</i> or hot weather rice, <i>chitka</i> , on friable light soil manured with about 370 head-loads of cowdung and forest litter and growing early as well as late rice. The latter occupies part of the field only, the rest being sown with other crops or left unsown. Crop irrigated from a forest stream which dries up in the beginning of March. Season average; tillage careful. Seed-rate very high. Outturn much below average. Incidence on the second crop alone.
25½	58¾	14¾ straw.	<i>Experiment No. 134.</i> —Same crop on similar soil manured with about 470 head-loads of the above manure per acre. Other conditions same as above. Outturn very poor and incidence high even for a second crop.

CROP EXPERIMENTS,
BOMBAY PRESIDENCY,
1895-96.

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8448

FROM

J. W. P. MUIR-MACKENZIE, ESQUIRE, I.C.S., M.R.A.C.,
Officiating Survey Commissioner and Director,
Land Records and Agriculture, Bombay;

To

J. MONTEATH, ESQUIRE, I.C.S.,
Acting Chief Secretary to Government,
Revenue Department, Bombay.

Poona, 10th December 1896.

SIR,

I have the honour to forward the Analysis of Crop Experiments, made in 1895-96, at about the same date as that on which the report was ready last year. The Analysis is the joint work of Messrs. Seddon and Mollison.

2. The table given below exhibits the extent of work done:—

Division.	1893-94.		1894-95.		1895-96.	
	Reported.	Rejected.	Reported.	Rejected.	Reported.	Rejected.
Northern Division	44	1	37	3	*30	4
Central Division	45	20	56	12	45	8
Southern Division	45	2	41	3	42	3
Total	134	23	134	18	117	15

* Exclusive of the 149 experiments of Surat on which a separate report has been submitted.

Of the gross number of experiments made, 4 were performed by Survey officers, and 7 by Superintendents, Land Records and Agriculture. The Superintendent of the Southern Division contributes three experiments for the first time.

3. In preparation for the quinquennial return of yield statistics all experiments are "ordinary", i.e., no attempt is made to study the general profits of agriculture by including in the scope of an experiment all the crops of an individual holding.

4. For some years, chiefly with reference again to the quinquennial return, an effort has been made to indicate the crops on which tests should be made in each district.

A statement is appended, which shows what crops were actually tested and which of them will find entry in the quinquennial return, the latter being marked with an asterisk:—

Division.	*Jowari.	*Bajri.	*Rice.	*Wheat.	*Barli.	*Nagli.	Tur.	*Gram.	*Sugarcane.	*Sesamum.	*Linseed.	*Rapeseed.	Nigerseed.	*Groundnut.	Total.
Northern Division	...	7	8	5	1	..	2	3	1	2	...	1	...	...	30
Central Division	13	6	1	10	...	2	1	4	..	3	2	...	...	3	45
Southern Division	7	2	9	5	1	2	2	7	...	...	3	..	4	...	42
Total	20	15	18	20	2	4	5	14	1	5	5	1	4	3	117

NORTHERN DIVISION.

5. The number of experiments conducted in the Northern Division is about the same as last year, the bulk being taken on *bājri*, wheat and rice.

6. Mr. Mead appears to have conducted a careful experiment (No. 3) upon sugarcane, Mr. Pherozsháh Pestonji has again distinguished himself by the ability and thoroughness with which he has reported five interesting experiments (Nos. 19—23), and Mr. Moore conducted a careful test (No. 27) on rice in the Thána district. The work of other experimenters hardly rose above the usual level. In Ahmadabad the District Deputy Collector, Mr. Jethálál Varajbhái, appears to have bestowed singularly little pains on this part of his work.

7. Mr. Pherozsháh's two experiments on rice (Nos. 19 and 20) seem to indicate that the assessment on lands under this crop in the district of Broach is not likely to prove excessive, a point upon which the special experiments, which it is hoped to undertake next year in this district, may be expected to throw light. The garden land (Exp. No. 22) tested by this officer which bore an assessment of Rs. 10-14-6 seems to be by no means over-rated, since the incidence of the assessment in a year when only a *bājri* crop was taken to rest the land does not exceed 23 per cent. Obviously in ordinary years when valuable garden crops are grown, the incidence will be far lighter.

8. I agree with Mr. Patvardhan that some inquiry is advisable regarding the apparently heavy incidence of the assessment on the *harik* land which forms the subject of Experiment No. 30. Possibly during the fallow years the land yields valuable crops of grass.

CENTRAL DIVISION.

9. The total number of reported experiments is considerably less than either last year or the year before, a fact which is to be regretted. The percentage of rejections is about the same. Mr. Mollison had doubts about the acceptance of some experiments (Nos. 36—38) reported by Mr. DuBoulay. These experiments referred to very low yields. The direction is that only crops representing an average of the season shall be selected. So far as can be gathered, the yield of the season was a low one in the tract selected by Mr. DuBoulay for experiment, and the tests, therefore, were legitimate. They give an indication, not without value, of the extent to which the assessment presses on cultivators in a poor season.

10. Mr. Cursetji's careful experiment (No. 73) on groundnut in the Sátára district is of considerable interest. He places the cost of cultivation at a tolerably high figure, giving the cultivator, however, on his 8-anna crop, a profit of Rs. 8 per acre out of a gross outturn Rs. 72-5-2; in other words of 11 per cent., the incidence of the assessment being only 4 per cent. The cost of cultivation, having regard to the high manuring of the land, is probably not under-estimated. The general conclusion is that groundnut is a decidedly profitable crop.

11. Still more interesting perhaps are the results of this careful experimenter's test (No. 75) on *Shálu jowári* which coincide with those of another shrewd observer Mr. F. B. Young in Ahmadnagar. In these two instances good black soil with irrigational advantages yields crops worth 50 to 100 times the assessment. Even with the addition of the water charge the Sátára crop was worth thirty-three times the assessment, and yielded a profit of Rs. 49 per acre. The assessment in the Nagar crop (Exp. No. 56) included the charge for water. Facts like these suggest reflections whether the richer soils of the Deccan when provided with water have not escaped too easily in the recent revisions. It is difficult to credit the correctness of the statement reported by Mr. Young that the extraordinarily valuable land on which he has reported should be mortgaged for the insignificant sum of Rs. 300. The terms on which the wheat and safflower field experimented on by this officer are held, appear much more probable.

12. The three officers alluded to in the last three paragraphs deserve acknowledgment for the care and interest bestowed by them on the experiments which they have reported.

13. At page 19 of the Analysis Mr. Mollison draws attention to the tendency which experimenters show to regard a 16-anna crop not as an average,

but as a bumper crop. It cannot be too often impressed on experimenters that, whatever the local practice in their districts, or the villages they select for experiment, yet for purposes of their reports, and in order to obtain a uniform basis of comparison, the average crop is to be represented by 16 annas.

SOUTHERN DIVISION.

14. The number of tests and percentage of rejections is practically the same as last year.

15. Again in the Southern Marátha Country the incidence of assessment is shown to be generally low. The apparent exceptions are cases where the crop taken is one of several grown on the land, and the yield therefore does not represent the total gross outturn. A particularly noteworthy instance of this is Mr. Lushington's experiment (No. 84) on *tur*. Here the assessment is shown at 77 per cent. of the yield of a good crop. This mode of exhibiting the facts is completely misleading. Without knowledge of the yield of the principal crop it is impossible to estimate the incidence of the assessment; all that this experiment shows is that by means of the subordinate crop the cultivator managed to more than clear his assessment, leaving himself clear the profits from the principal crop.

16. The table of average incidence on dry-crop land in the Bijápur district given at page 35 of the Analysis will be of interest.

17. The best work in this division seems to have been done by Messrs. Artál, Kelkar and McNeill. Mr. Pánse also bestowed much pains on his experiments.

18. The special experiments in the Surat district have been made the subject of a separate report.

I have the honour to be,

Sir,

Your most obedient Servant,

J. W. P. MUIR-MACKENZIE,

Officiating Survey Commissioner and Director,
Land Records and Agriculture.

ANALYSIS OF CROP EXPERIMENTS.

NORTHERN DIVISION.

Ahmadabad.

Rice, *juvār*, wheat, gram, *bājri* and sugarcane were selected for tests in this district, and experimenters were asked to choose one or other of these. Mr. Robertson has submitted two tests on rice, Mr. Mead one on sugarcane, and the District Deputy Collector three on wheat. Mr. Robertson did one more test in *juvār*, but the results being unsatisfactory, he did not report it.

Mr. L. Robertson, Assistant Collector.

Two experiments are submitted. They are very unsatisfactory, and I include them with some hesitation. The report was submitted by Mr. Mead, who has apparently prepared it from Mr. Robertson's notes. The samples received in this office are stated to have measured $1\frac{1}{2}$ *ser* each. One bag was found to contain $56\frac{1}{2}$ *tolas* and the other 50 *tolas*, giving a deficit of $3\frac{1}{2}$ and 10 *tolas* respectively. This throws considerable doubt on the correctness of the figures recorded.

The rice is in both cases *Sutarsāl* rice. The first field (Exp. No. 1) is said to be *kālī* (black) soil and the second (Exp. No. 2) *kiāri* (rice) land. Both fields are close together. The second field is classed as Rice land and assessed at Rs. 4-3-9 per acre. The first field is classed as Jirāyat at Rs. 2-10-6 per acre and was converted into Rice some five years ago. They both grow rice invariably without a second crop. Mr. Robertson thought the crops good average ones for the year. The season was bad owing to deficient late rain. I have no doubt the outturn is much below the average of favourable years. The first field is said to have an 8 to 10-anna crop, the second a 12-anna one. The first field got about 7 and the second 4 loads of manure per acre.

Outturn, &c., was:—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		Principal Product.	By-Product.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
Experiment No. 1 ...	8 to 10	429	2,200	13 10 5	2 10 6	19.45
Do. No. 2 ...	12	774	3,250	23 11 9	4 3 9	17.84

Mr. P. J. Mead, Assistant Collector,

Sends in an experiment (No. 3) on sugarcane. The field is Jirāyat *gorādu* soil, assessed at Rs. 11 for 4 acres 34 gunthas or Rs. 2-4-3 per acre. The variety of cane grown is *Dholi Sherdi* or white cane. The field belongs to a Bania, who sublets it to a cultivator for Rs. 40 plus 1 maund of *gol* when sugarcane is grown. Of the whole field 1 acre 2 gunthas was planted with cane, and the experimenter tested a patch of 8 gunthas. Mr. Mead must have taken a good deal of trouble over it.

The well, a two-bag (*kos*) one, belongs to the Bania, who charged nothing for it. It also irrigates another field. The plough and cattle used belong to the cultivator. The season is described as fair, but there was not enough rain, and the cultivation as very fair; and the anna estimate is given as 12. For the 42 gunthas of land 45 carts of manure are said to have been applied. Some

castor cake also was applied, but Mr. Mead's remark about this is not understood. He says: "70 maunds of *erandi* crop refuse not made up into cakes with *māti*, because the soil is not sandy." A reference has not explained the matter, as Mr. Mead thinks it is quite clear. About 30,476 sets are said to have been planted per acre by being pressed into flooded ground. This is a high seed-rate. Mr. Mead says the crop was planted in August or September, but this must be a mistake, as it was cut at the end of January and sugarcane takes about a year to grow. The mill used was a three-roller wooden one worked by two pairs of oxen. It is said to be worth Rs. 75 and to last a year. Its hire, including boiling pan, juice-receiver, &c., is Rs. 3 a day, which seems a high rate. There are 15 such mills in Dholka.

Mr. Mead gives an estimate of the cost of cultivation. I fear it is somewhat too vague and several of the items are liable to very obvious objections, and certain expenses have not been allowed for.

However I append it:—

	Rs.	a.	p.	
Rent	8	10	6	+ 1 maund Gol.
Manuring 1st time	32	0	0	
" 2nd "	35	0	0	
Seed	72	0	0	
Weeding and planting	15	0	0	
Tying canes together... ..	17	0	0	
Puggis to keep off jackals	10	0	0	+ ½ maund Gol.
Repair of Bāndh	4	0	0	
Hire of mill (5 days)	15	0	0	
Bullocks for work (Re. 1 per * <i>kothi</i> —25 <i>kothis</i> to the acre)	26	0	0	
Digging pits for mill and furnace... ..	5	0	0	
Fuel (<i>tuver</i> stalks)	12	8	0	
Labour (5 days)	29	3	0	

I cannot follow Mr. Mead in his detailed estimate for labour, or quite understand how the exact sum of Rs. 29-3-0 is obtained. The total expenses thus estimated come to Rs. 281-5-6 plus 1½ maunds of *gol* for the 1 acre 2 gunthas. Of the crop the experimenter says there were better sugarcane fields in the district, but none were available for experiment.

Gol is priced at Rs. 3-8-0 per maund or 11 lbs. 28 *tolas* per rupee. This seems astonishingly high, and I cannot help thinking there is some mistake. Mr. Mead says the price one day was Rs. 3-12-0 and another day Rs. 3-8-0 per maund, corresponding to 11 lbs. 28 *tolas* and 10 lbs. 37 *tolas* per rupee.

Outturn details are:—

	Per 8 Gunthas.	Per Acre.
Number of canes	7,181	35,905
	Lbs.	Lbs.
Weight of canes	7,398½	36,992
" of juice	4,845	24,225
" Gol	882¼	4,411
	Rs. a. p.	Rs. a. p.
Value of Gol (at the high price quoted)	75 4 3	376 5 3
Incidence of assessment	0.60	per cent.
Percentage juice to cane	65.48	"
" Gol to juice	18.21	"
" Gol to cane	11.92	"

Mr. Jethálál Varajbhái, District Deputy Collector,

Sends in three experiments (Nos. 4 to 6) on wheat. He has not offered a single remark to explain his figures. The season is said to have been unfavourable owing to insufficient rain, and the cultivation indifferent. How the cultivation was indifferent is not stated, except that there was no manure applied. The soil is black soil. The experimenter says that the soil is never manured, as it is in itself rich and its richness is sometimes assisted by the flood water spreading

* Bullocks are hired at Re. 1 for each *kothi* (juice-receiver) filled. Five *kothis* of juice were got from 8 gunthas.

over the soil and depositing manuring ingredients. All three crops are estimated at 8 annas. All three fields are in the same village and grow the same crops—wheat, cotton and *juvār*.

I tabulate the results :—

		OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		Principal Product.	By-Product.			
		Lbs.	Lbs.			
Experiment No. 4	...	138	164	Rs. a. p. 4 11 6	Rs. a. p. 1 12 6	37·74
Do. No. 5	...	218	128	7 11 10	1 15 4	25·30
Do. No. 6	...	242	246	8 14 7	1 8 8	17·29

The seed-rate is given in each case as 51 lbs. per acre, apparently from general enquiries. The variety of wheat of the first test is red *kātha* valued at 32 *sers* per rupee, and of the two other white, valued at 29 *sers* per rupee. According to the formulæ the outturn of the first test represents a 2-anna crop and of the others a 3 to 4-anna crop. It is impossible to consider these crops as representative. The experimenter appears to have got through his experiments as quickly and easily as possible.

Kaira.

The Sub-Divisional Officers were asked to make three experiments each, at least two of which to be on *bājri*; other crops to be selected to be *kodra*, *rāgi*, gram and sugarcane in the order given. There was no Assistant Collector when the *bājri*, *kodra* and *rāgi* were being reaped. Mr. Doderet therefore made two experiments on *tuver*. The District Deputy Collector has submitted four tests on *bājri*.

Mr. W. Doderet, Assistant Collector,

Finding himself unable to act according to instructions, cut two *tuver* crops. Both the fields (Exp. Nos. 7 and 8) had *kodra* as well as *tuver*. The *kodra* was reaped at Divāli time. There is no indication of the value of the *kodra* reaped. Both fields are of *gorādu* Jirāyat soil, fairly heavily assessed. The first field had no manure. The second was lightly dressed with cow-dung at the rate of 3½ loads per acre put on in June. The seed-rate is worked out to 4½ lbs. of *tuver* per acre. Ten local *sers* of mixed *kodra* and *tuver* are drilled per Bigha of 23 gunthas, the proportion of *tuver* to *kodra* being as 1 to 3.

The results are thus shown :—

		Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
			Principal Product.	By-Product.			
			Lbs.	Lbs.			
Experiment No. 7	...	14	549	390 chaff. 1,170 sticks.	Rs. a. p. 17 2 0	Rs. a. p. 4 12 9	28·01
Do. No. 8	...	16	772	595 chaff. 1,040 sticks.	23 8 6	6 5 11	27·07

Mr. Doderet cut separate patches to ensure getting a fair average. The first field grows *bājri*, *juvār*, *bāvto*, &c., and the second the same crops and tobacco. Both crops suffered from the failure of the late rains. The percentage incidence is in each case on the *tuver* alone.

Mr. B. E. Modi, District Deputy Collector,

Submits four tests on *bājri*. In each case the crop experimented upon was as usual grown mixed with pulses. The principal crop only was in each case tested. The season was in at least three cases decidedly unfavourable for *bājri*. The subordinate pulses, though not tested, are reported to have been comparatively poor crops. Mr. Modi's experiments throw no light on the incidence of assessment. Each field has *gorādu* soil. There is very little variation in the assessment exigible. It varies between fields from Rs. 4-9-2 to Rs. 4-14-9 per acre.

The first field experimented upon (No. 9) grew in 1893-94 sugarcane, which was rather heavily manured. *Bājri* and wheat, each unmanured, were grown in 1894-95. This year the *bājri* had subordinate to it *math* and *guvār* and was manured at the rate of 6 loads of ordinary manure per acre. The tillage is described as good. The crop was hastened to maturity owing to want of rain. The seed was drilled at the end of June and the crop was harvested at the end of September. The *math* and *guvār* were only middling. The *bājri* yielded 608 lbs. grain and 2,667 lbs. useful by-product together worth Rs. 22-12-3 per acre. This is estimated as a 14-anna outturn. The incidence of assessment works out 20·98 per cent.

The second experiment (No. 10) gave very poor results. The field was last manured in 1893. It grows *bājri* with subordinate pulses every year. This year *math*, *mag*, *chola* and *guvār* were grown mixed with the cereal. The seed was drilled on the 20th July very late in the season. The *bājri* was reaped on the 12th October. It yielded only 174 lbs. of grain and 631 lbs. of useful by-product together worth Rs. 7-0-9 per acre. The incidence of assessment is 68·07 per cent. There is no doubt that the lateness of sowing and the scant rainfall in September had a disastrous effect on the outturn, which I think is very much over-estimated at 10 annas.

The third and fourth fields experimented upon by this officer gave miserably poor results. Mr. Modi would have been well advised to have left such fields alone. In each case the cultivation is described as indifferent, and in each field sowing was belated. Neither field was manured for the crops tested. The subordinate pulses were in each field *math* and *guvār*. The pulses were expected to yield fairly well. The incidence of assessment on the gross value of *bājri* works out 138·70 per cent. for the third field and 92·01 per cent. for the fourth. The figures of these two tests are not entered in the tabulated statement of results.

Panch Maha'ls.

The Assistant Collector was asked to conduct three experiments on *bājri* and two on wheat. Three on *bājri* were done but only one on wheat. Mr. Wales was hampered during the wheat harvest by threatened disturbances at Shera. The District Deputy Collector was asked to do three experiments on gram and three on rape-seed. Mr. Jivanlāl did three on the former but only one on the latter as he could not find it unmixed with other crops.

Mr. J. A. G. Wales, Assistant Collector,

Sends three experiments (Nos. 11—13) on *bājri*. The remarks are rather meagre. All three experiments were taken in the same taluka and two of them at the village of Isrodia on the same day. All three fields are of *gorādu* soil. Prices of produce are the same; 30 lbs. *bājri* to the rupee and 25 lbs. chaff and 100 bundles or 200 lbs. straw to the rupee. The price of the by-products is taken at much too high a figure. The chaff is valued dearer weight for weight than the grain and its value exceeds Rs. 9 per acre in the first test. At Godhra, where the first experiment was taken, the rainfall was latterly deficient and the crop suffered. At Isrodia the season is said to have been satisfactory as far as rain was concerned. Probably the later rainfall was short there too. In the second and third experiments the anna valuation is given as 8. As the season is said to have been satisfactory and the cultivation good and a fair amount of manure was applied, it is not clearly understood why the crop is estimated as only a half crop.

All the fields were manured at the rates of 9, $6\frac{2}{3}$ and $10\frac{1}{2}$ cart-loads respectively per acre. Seed was twice sown in the first and third fields and it is presumed that the seed-rates given are for the double application, but Mr. Wales does not clearly say. The second field was only once sown and the high rate of

seed, over 51 lbs. per acre, is certainly an exaggeration, and the experimenter does not himself believe it to be correct. All the fields had subordinate crops, but they were not tested. In the first field the seed was broad-casted, in the other two drilled. Mr. Wales calculates from the seed-rates, that in the first field out of 10 gunthas $7\frac{1}{2}$ were *bájrí*, $1\frac{7}{8}$ *tuver* and $\frac{5}{8}$ *math*; in the second out of 12 gunthas, *math* and *mag* occupied $\frac{12}{31}$ guntha; in the third out of 10 gunthas *math* occupied $1\frac{2}{23}$, brinjals and chillies $\frac{5}{23}$. All these calculations depend for their correctness on the assumption that a given quantity of seed occupies a constant space no matter what sort of seed it is, an assumption which of course is not correct.

Outturn, &c., figures per acre are :—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		Principal Product.	By-Product.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
Experiment No. 11...	12	709	{ 228 chaff ... 2,000 straw ... }	42 11 10	1 2 1	2.65
Do. No. 12...	8	199	{ 75 chaff ... 728 straw ... }	13 4 4	0 13 4	6.13
Do. No. 13...	8	464	{ 144 chaff ... 1,264 straw ... }	27 14 9	1 6 8	5.08

In each case the incidence of assessment is very low.

Mr. Wales also sends one experiment (No. 14) on wheat. The wheat is an inferior kind and is grown as a second crop after rice. The soil is said to be stony, but what there is besides stones is not stated. The field grows rice followed by a second crop as a rule. Before the rice it was well manured with 27 cart-loads of farmyard manure per acre. The rainfall was deficient, but the cultivation good. The wheat is said to have been sown broad-cast in January. I should imagine this is a mistake, as the rice must have been harvested in October or November and the soil must have been quite dry by January. Straw and chaff are not valued because 'they are not offered for sale in the Bazar.' Yet things which are not offered for sale may have a value, and here the by-products are useful and should have been valued.

Outturn, &c., per acre :—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		Principal Product.	By-Product.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
Experiment No. 14 ...	8	506	932 straw 137 chaff.	17 7 2	1 13 5	10.54

The grain is valued at 29 lbs. per rupee. The incidence of assessment very low for a second crop only, would have been still lower had the by-products been valued.

Mr. Jivanlál Pránjivandás, District Deputy Collector,

Conducted four tests, one on rape-seed and three on gram, which, however, have been submitted by Mr. Heblikar, who resumed charge of his office on return from leave.

It was found difficult to find rape-seed as a sole crop. This oil-seed is generally in the district grown in rows subordinate to gram or some other rabi crop. All the crops tested were second crops after maize, and although the season was not quite favourable, the incidences shown are so moderate that the

burden of assessment must necessarily be very light. The fields selected for experiment have each *gorádu bhuri*, light brown, soil.

The rape-seed field (Exp. No. 15) bears an assessment of only Re. 0-15-9 per acre and grows two crops every year, maize or rice as a rain crop, gram and rape-seed in the rabi season. The kharif crop was this year manured with 10 loads per acre of cow-dung. Season and tillage are each described as good. The rape-seed was sown through a seed tube fixed behind a plough in November and produced a crop ripe about the end of February, which was estimated at the maximum standard and yielded 441 lbs. oil-seed per acre, worth with the by-product Rs. 23-5-6. The incidence works out 4-21 per cent. only, which, if the occupant's interest only is considered, is extremely satisfactory.

The gram fields tested (Nos. 16—18) did not yield so well. The outturn results are very uniform, and the assessment exigible from each field does not vary much. The respective assessments are Re. 1-3-2, Re. 1-3-9 and Re. 1-9-11 per acre. The season is described as below average and the cultivation indifferent in each case. Maize, the kharif crop on each field, was manured in each case with 8 loads cow-dung per acre. One crop was tested on the 24th February, the other two on the following day, each in a different village. The seed-rate of the first field, 25 lbs. per acre, is under average. The seed-rates of the other two fields, 51 and 48 lbs. per acre, are probably about right. The gram was sown in the same way as the rape-seed.

Outturn, &c., results are as under :—

		Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assess- ment.
			Principal Product.	By-Product.			
			As.	Lbs.	Rs. a. p.	Rs. a. p.	
Experiment No. 16	...	16	349	492	9 4 0	1 3 2	12-95
Do. No. 17	...	15	359	428	9 6 4	1 3 9	13-13
Do. No. 18	...	11	333	256	8 8 3	1 9 11	19-02

Broach.

The programme for this district has been fully worked out. Mr. Pheroazsháh submits 2 tests on rice, 1 on *bájrí* and 1 on sesamum. Second crop in one of the rice fields has also been experimented upon. The results have, as usual, been very carefully reported. Mr. Sorábsháh did one test each on rice, *bájrí*, sesamum and cotton.

Mr. Pheroazsháh Pestonji, District Deputy Collector,

Submits in all five experiments. Two are on rice, one on mixed wheat and *vál*, a second crop on the second rice field; the fourth experiment was on *bájrí* and the fifth on sesamum. The experiments are exceedingly well reported, information of considerable value being given in a concise and clear manner.

The rice experiments (Nos. 19 and 20) may, with advantage, be contrasted. The two principal varieties of this officer's charge were selected, *Sukhvel*, a fine late ripening variety, and *Jádu Sáliu*, a coarse early ripening sort, the cultivation of which is much more extensive. A second crop is not usually got after the first variety, but is commonly taken after the second if late rains are favourable. Mr. Pheroazsháh took the trouble to test the second crop of wheat and *vál* grown on the coarse rice field, and therefore we have, at hand, the information necessary to give a fair idea of the burden of assessment on each field.

The *Sukhvel* rice field belongs to a Koli. It extends to 19 gunthas and bears a consolidated charge of Rs. 7-10-1 per acre for soil and tank water assistance. The Koli purchased the field five years ago for Rs. 100 and got it in a neglected state. He restored the bunds and liberally each year manured the field, and now is rewarded by a considerably increased outturn. The rice field lies close to the tank and this year got a full supply of water even though the rainfall was deficient and the tank has silted up. *Sukhvel* rice requires water

till late in the season. The crop tested did not ripen until the 10th of December. The cultivation is described as excellent. The occupant has a good many cattle and can usually collect about 100 loads of manure annually, all of which goes to his rice land, which extends to about $2\frac{1}{2}$ acres. The field tested got 30 loads for 19 gunthas. The crop was grown from transplanted seedlings; $2\frac{1}{2}$ gunthas of seed-bed to 19 gunthas of field, 90 lbs. of seed being required per acre of transplantation. *Sukhvel* rice is in great demand. It is bought up by Broach merchants. Mr. Phero-zsháh says the average dry-crop rate at Kátpore is about Rs. 4-8-0 per acre. The comparison between this and the rates for rice land is very favourable to the latter, especially as there is cheap and easy communication with Broach, the principal market of the district. Mr. Phero-zsháh says the assessment for rice land in other parts of his charge is 50 per cent. higher and "that seems the right pitch."

Mr. Phero-zsháh selected at Chorási a field growing *Jádu Sáliu* rice. The field is owned by a Pátidár, who during the last three years has let it to a Káchia. The tenant bears all charges except assessment and gives the owner half the produce. This is known as the *adh* system of tenantry. "The field lies in the way of flood waters discharged from the lands of the neighbouring villages and for this advantage a consolidated rate equal to Rs. 10-3-0 an acre was fixed at the original survey. It is much higher than that at Kátpore and there is this further drawback that the supply of water cannot be regulated according to requirements. After heavy and continuous rainfall the water stagnates in the field for a long period to the detriment of the crop, and when there is any prolonged break no water at all is available. Although *Jádu Sáliu* is a hardy plant, it must necessarily suffer to some extent under alternating deficiency and excess of moisture."

The rains were deficient, and the tested crop is reported to have yielded only about $\frac{1}{3}$ rd of the average outturn. The cultivation was fairly good. The tenant has only one pair of bullocks and bought in another village 24 loads of cattle manure which he applied to the field, 1 acre 13 gunthas. The crop was grown from transplanted seedlings raised in rich land near the town site, Rs. 2 being paid for the right of sowing 1 maund of seed and taking the seedlings produced therefrom. The seed-rate for an acre of transplantation works out to 55 lbs. The experimenter was unable by enquiry to find out why the seed-rate for *Sukhvel* and *Jádu Sáliu* varies so much.

Wheat usually follows rice in the field referred to above, unless as in 1894 the late rains are scant. The October rains of 1895 favoured the sowing of a second crop, and wheat and *vál* (Exp. No. 21) were sown mixed. The tenant did not expect a good crop owing to scant late rainfall. I do not think, however, that there could have been much deficiency of moisture in the soil because the crop took nearly five months to ripen. Weeding was neglected and the experimenter says weeds choked the wheat and gram. Under the circumstances the outturn is as good as could reasonably have been expected. Wheat and *vál* were worth about 25 per cent. more than usual, and the by-products were also considerably dearer than in ordinary season.

I tabulate the results from the two rice fields as under :—

C	Crop.	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
			Principal Product.	By-Product.			
		As.	Lbs.	Lbs.	Rs. a p.	Rs. a p.	
Experiment No. 19 ...	Sukhvel rice ...	20	3,445	5,575	126 5 0	7 10 1	6.04
Do. No. 20 ...	Jádu Salin rice ...	10	1,670	3,935	46 0 6	10 3 0	13.88
Do. No. 21 ...	Wheat ...	10	410	490	23 7 9		
	Vál ...	6	105	110	3 13 0		
					73 5 3		

I think it is probable that the crops of the Chorási field should each bear higher anna estimates.

The *bájrí* tested by this officer (Exp. No. 22) yielded well. The field has superior order Garden soil and is irrigable from a well having an abundant supply of good water. The number extends to 2 acres 8 gunthas. The well irrigates this and other adjoining land, in all 6 acres 13 gunthas. The well and the whole area irrigated by it belong to a Pársi. The cultivator is a Bohora and gives the Pársi Rs. 110 rent or Rs. 17-5-0 per acre, the Government assessment being Rs. 10-14-0. The field experimented upon grows sugarcane, onions, sweet potatoes, rice, &c., but in order to rest the land from irrigation a dry crop is grown on a portion of the number annually. Sometimes the dry crop is *bájrí*, sometimes *juvár*. The *bájrí* this year occupied about half the number. Manure was not given, nor is it usual to manure such land when a dry crop is grown, because land which grows garden crops is invariably maintained at a high state of fertility. Rain was deficient in September; therefore the crop was once irrigated in that month.

Outturn, &c., results are as under :—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		Principal Product.	By-Product.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
Experiment No. 22 ...	18	1,205	3,010	46 14 0	10 14 6	23.26

Although the incidence of assessment appears high, I do not think that the burden of assessment is heavy.

I quote almost verbatim the experimenter's remarks about his fifth experiment (No. 23) on *tal* : " Like *bájrí*, *tal* is rarely grown for its own sake in my charge. It is resorted to for the purpose of resting land for cotton. The crop, which for this purpose usually rotates with cotton, is *láng*, but the latter only thrives in low-lying damp soil, and on high ground its place is taken by *tal* or *juvár*."

The holder of the field is a Kanbi woman from whom it has been rented for the last 5 years by a Koli at the rate of Rs. 10 per acre per annum. The tenant has no land of his own, but he cultivates in all about 12 acres of land rented from other occupants. He has one bullock only and gets another for ploughing, &c., from another man similarly circumstanced, the advantage being reciprocated.

The field appeared clean and well cared for : the tenant had evidently taken much pains with it. The season was, however, unfavourable owing to scant rainfall, and the outturn was therefore poor. The tenant earned but little more than the rent charge, but, as already stated, *tal* is not the rent-paying crop of the land and the season was against any fair outturn.

The field has good black soil assessed at Rs. 4-10-2 per acre. The crop only yielded 150 lbs. seed worth Rs. 11-13-0 per acre. This is called an 8-anna crop. Incidence works out 39.51 per cent.

Mr. Sorábsháh Hormasji, District Deputy Collector,

Forwards four experiments, one on rice, one on *bájrí*, one on sesamum and one on cotton.

The experiment (No. 24) on rice is of doubtful utility. The rice is drilled and is followed by a rabi crop of wheat or *juvár*. This year's crop is estimated at 4 annas. Outturn is 246 lbs. paddy and 779 lbs. straw per acre, and the value of the yield of the single crop not much more than half the Government assessment.

The *bájrí* crop (Exp. No. 25) was a good one. The *bájrí* suffered from want of rain, but this crop is said to be a 20-anna one. The estimate is probably wrong and it should be 14 or at most 16. Fifty loads of manure are said to have been applied to the land under *bájrí* (1 acre 1 guntha). I have no doubt that this is a very considerable exaggeration. Seed-rate is rather high, 10½ lbs. per acre. *Bájrí* is priced rather high, 28½ lbs. per rupee. *Bájrí* straw is

valued much lower than rice straw; the latter indeed seems to be priced too high at rather less than 3 cwts., say 320 lbs. per rupee. The outturn of *bājri* comes to 1,350 lbs. and straw 2,195 lbs. valued at Rs. 51-4-8. Incidence of assessment comes to 26·82 per cent. Mr. Sorábsháh Hormasji has in both cases calculated the incidences upside down, that is, by dividing the yield by the assessment instead of *vice versa*.

Both these experiments were made in the same village and on the same day. The soil is in each case called by the experimenter *gorádu*, and he says the whole village is assessed as Garden land. The fact is that the land is alluvial soil, or Bhátha, similar to the lands on the north bank of the Tápti at Surat. The village of Borbhátha is almost entirely composed of alluvial deposits from the Narbada.

The sesamum tested (Exp. No. 26) grew on light, *gorádu*, soil assessed at Rs. 5-5-10 per acre. The season was poor owing to deficient rainfall, and the anna estimate is 8. No manure was applied this year. Some was put on last year. The field is under a sesamum cotton rotation and the cultivator says sesamum is a good preparation for cotton—no doubt true. Seed-rate per acre is given as 9½ *tolas* or ¼ lb. This I think must be too little, though the quantity of seed sown for this crop is very small. The field was well-tilled, seed was sown by a drill in August. The owner stated that he ploughed his field seven times and weeded it thrice. Mr. Sorábsháh says that the average yield of sesamum is about 6 maunds per acre or double this year's produce.

Outturn, &c., per acre:—

		Anna Estimate.	Outturn of Seed per Acre.	Value of Outturn	Assessment per Acre.	Percentage Incidence of Assessment.
		As.	Lbs.	Rs. a. p.	Rs. a. p.	
Experiment No. 26	...	8	131	11 0 0	5 5 10	48·76

This officer's last test was taken on cotton growing on a field of *gorádu* soil assessed at Rs. 7-11-10 per acre. Mr. Sorábsháh says this was an average field for the locality and year. He says the field is stated to yield 295 lbs. cotton in an average year and therefore calculates the anna valuation at 20. This is, in my opinion, undoubtedly too high, as the crop is stated to have suffered from the holding off of the rain in September. The field grows cotton, with occasional crops of *bājri*, *math*, *tuver* and *kodra*. No manure was applied this year, but is said to have been well manured before last year's crop. Mr. Sorábsháh allowed the Mámlatdár to superintend the pickings, and for this reason the experiment is not entered in the tabulated statement of results. The orders of Government are that crop experiments are to be done by officers not inferior in rank to Deputy Collectors.

Cotton is sold by the *bhár*, which in Broach is a weight of 20 *dhadis* of 48 *seers*, each *ser* weighing 40 *tolas*. Pickings on the 10 gunthas are thus shown:—

Date.	Local.	Rate per Bhár.	Value.
	Srs. ts.	Rs.	Rs. a. p.
4th January	18 35	96	1 14 2
13th do.	13 0	100	1 9 0
22nd do.	10 15	96	1 0 7
3rd February	10 25	96	1 1 0
13th do.	18 0	95	1 12 6
26th do.	14 5	83	1 5 8
11th March	1 22	82	0 2 1
Total	88 22	...	8 13 0

The price of cotton sustained a sudden and severe drop about 25th February. The acre outturn is 363 lbs. seed cotton, valued at Rs. 35-4-2, giving an incidence of assessment of 21·94 per cent. Seed-rate was about 6 lbs. per acre.

Of 100 *tolas* of seed cotton kept for test the constituent parts were :—

	<i>Tolas.</i>
Lint	38
Seed	61
Waste	1

Surat.

Special arrangements were made to carry out experiments on an extensive scale in this district, and in all 149 experiments were carried out. These have been analysed by Mr. Seddon and are separately printed and attached to this report.

Thana.

Experiments on rice, *kodra*, sesamum and gram were ordered from this district. Four tests in rice have been reported; 1 by Mr. Moore, 1 by Mr. Clements and 2 by Mr. Patvardhan. The last named officer did also one test in *kodra*. The explanations offered by these officers for not doing the full number have been regarded by the Collector as satisfactory.

Mr. R. A. L. Moore, Assistant Collector,

Reports a careful experiment (No. 27) on rice. The field grows rice every year, but no second crop. It belongs to a pleader who bought it from a Mussalman four years ago. It is sublet to a tenant who has cultivated the number for the last three years. He pays in kind, giving 23 *pharas* of rice in husk annually, i.e. 1,564 local measure *sers* of (about) $39\frac{1}{2}$ *tolas* each. This payment was equal to 23 per cent. of the total produce of the field this year. The pleader pays Government assessment Rs. 19-7-6 and local cess Rs. 1-3-5 = Rs. 20-10-11. The difference between this and the value of the payment in kind was this year Rs. 11-14-2, which represents clear profit on the number, which is, exclusive of *Pot Kharab*, 3 acres 28 gunthas in extent. The season was favourable; the rains in November did no harm, as the field lies high. The crop was estimated locally as an average one. The seed-bed was manured with dry fish (*kuta*), but no manure was applied to the field. The area of seed-bed to acre of transplantation could not be determined; but the seed-rate is reported as $46\frac{1}{2}$ lbs. per acre. The seed was sown in June and the seedlings transplanted in July. The crop ripened in November and yielded 1,819 lbs. grain and 116 head-loads of straw per acre, together worth Rs. 42-0-11. The crop was believed to be above the average of the village, but Mr. Moore's choice of fields was limited, as a good deal of rice had been cut when the test was taken. The incidence 12·50 per cent. is moderate.

Mr. E. Clements, Assistant Collector,

Sends one experiment on rice. The variety is *Garva Kolumba*. The soil is first order black, locally known as *revas*, growing rice every year. The season is said to be good but not so good as 1894. The outturn is said to represent a 16-anna crop, but it is so high that I think there must have been an error in the experimenter's calculations. The crop is reported to have yielded 2,900 lbs. of clean rice per acre and nearly 14,000 lbs. of straw. I doubt very much whether the finest possible crop of rice could yield so much straw. The cleaned rice is valued at the exceedingly cheap rate of $54\frac{3}{4}$ lbs. per rupee, and the by-product at the extravagantly high rate of over Rs. 34 per acre. The sample of grain sent to my office was unhusked, and I think it is probable that the outturn reported is that of unhusked grain. Mr. Clements says the Talati was ordered to select two or three average fields and this being near the camp was finally selected. A little over 12 gunthas had been left uncut (the field measured 1 acre $35\frac{3}{4}$ gunthas), and out of this the test area of 8 gunthas was selected. The experimenter further says: "The part chosen was slightly better soil and with more water than the rest of the field." Probably also the crop was better than in the rest of the field. In any case it is very doubtful whether the test area was average for the rest of the field. The experiment is not reported.

Mr. V. R. Patvardhan, District Deputy Collector,

Submits three tests, two on rice and one on *harik*.

The two experiments (Nos. 28 and 29) on rice were taken at the same place and on the same day. Both fields have black Kharif soil, and grow rice every year.

The first field grew *Halvi Patni* rice. The cultivation and season are described as good. Six loads of cow-dung and six of dried grass were put on the seven gunthas of seed-bed for *ráb* and 69 lbs. of seed were broad-casted on it to supply one acre of transplantation. The rice is valued at $44\frac{1}{2}$ lbs. per rupee and the straw at $6\frac{6}{7}$ cwts.

In the second experiment the variety is *Halva Kolambya* valued at the high rate of $34\frac{1}{2}$ lbs. per rupee. Straw is valued only at $8\frac{2}{7}$ cwts. per rupee, being coarser and eaten only by buffaloes. The cultivation is described as very good and 62 lbs. of seed were put on 3 gunthas of *rábed* seed-bed for one acre; three loads of cow-dung and three of dried grass formed the *ráb* material. It is not quite clear why so little as 3 gunthas was enough for the acre here while seven were required in the case of the first experiment.

I show the outturn figures:—

		Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
			Principal Product.	By-Product.			
			Lbs.	Lbs.			
Experiment No. 28	...	16	1,606	1,910	38 12 0	3 7 0	8.87
Do. No. 29	...	18	2,310	3,500	70 2 6	3 11 8	5.31

In both cases the incidence is very low.

The third experiment (No. 30) is on *harik* or *kodra*, also done on the same day and at the same village. The land appears to be somewhat highly assessed at Rs. 3-7-0 per acre. The experimenter says: "The land selected for experiment is a Kharif land, but is not so rich as to produce rice or any other better crop. It is full of *murum* and is not suitable for any other crop except the one under experiment. It has been under cultivation for the last three years with this crop only. It will have to lie fallow for about eight to ten years. No other crop is said to have even been grown before on this land." No manure was applied. Seed-rate is given as 51 lbs. per acre, which is nearly six times the formulæ rate, and is probably exaggerated. Yield is 1,551 lbs. grain and 2,475 straw valued at Rs. 11-14-0. Incidence comes to 28.94 per cent. Even if we suppose the three years' yield to be worth Rs. 50 and only eight years' fallow to be given, it is difficult to see how the land can possibly pay.

The crop is estimated at 18 annas and is very nearly double the maximum crop of the formulæ. Both grain and straw are valued at an extremely cheap rate, $137\frac{1}{5}$ lbs. and $35\frac{1}{5}$ cwts. respectively per rupee. The by-product, however, is often not valued at all. It is used largely for *ráb*.

Of *harik* (or *kodra*) Mr. Patvardhan says: "A few cultivators grow this corn for their own consumption and generally not for sale. It is not consumed immediately after it is harvested. It is stored and kept in receptacle with its mouth shut. This crop is used when the cultivators feel needy after washing it to take away its intoxicating properties. It is mixed with rice when eaten. It is used only by the lower classes."

CENTRAL DIVISION.

Kha'ndesh.

Each of the five district officers was asked to conduct four experiments, two on *bājri*, one on sesamum and one on wheat if possible. Mr. DuBoulay carried out the programme and did two extra tests on wheat. Mr. Bomanji did only two on wheat. Mr. Hatch carried out the programme. Mr. Shitārām Dámodar carried out two tests on *bājri* and one on sesamum, but the results are not reported for reasons given further on. Mr. Lallubhái Gordhandás conducted two *bājri* experiments, but did not report them owing to unsatisfactory results. Later on he was prevented through illness to carry out sesamum and wheat tests.

Mr. F. B. Young, Superintendent, Land Records and Agriculture, C. D., sent in two *jowári* tests from this district.

Mr. K. R. Bomanji, Assistant Collector,

Sends two tests (Nos. 31 and 32) on dry-crop wheat, *gore gahu*, in the Sindkheda taluka. They are estimated as 8-anna crops, and the season was bad owing to lack of rain. The soil is black soil with an admixture of sand, and the fields grow *bājri*, cotton, wheat, linseed and sesamum. The tests were both taken on the same day and at the same village. The first field was unmanured, it is manured once in three years, and the second is said to have had 19 cart-loads per acre of manure put on before sowing. Mr. Bomanji doubts this and so do I. Some of the manure is said to have been homestead, and the rest purchased at annas 8 per load. Mr. Bomanji thinks the man may remember correctly what he purchased, but cannot be sure about the amount of his own manure. The man certainly may remember, but he may perhaps not be truthful. As for the effect of the manure, Mr. Bomanji says: "The Khátedár explained that it proved a bad year for the application of manure. The soil, he says, required greater moisture by reason of its being manured; that moisture being wanting, the soil proved, in his words, *too hot* for the crop. Not being a practical agriculturist, I refrain from hazarding any opinion about it." There is a certain amount of truth in the cultivator's statement. The manure applied would undoubtedly have proved more effective if the soil had remained moist during the whole period of growth.

Outturn, &c., results per acre are :—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		Principal Product.	By-Product.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
Experiment No. 31	8	342	766	11 2 5	2 11 1	24.14
„ No. 32	8	356	923	12 0 6	2 14 1	23.93

Mr. J. H. DuBoulay, Assistant Collector,

Submits one test (No. 33) on sesamum and two (Nos. 34 and 35) on *bājri*, all taken on the same day on fields apparently close together in the same village. The sesamum was decidedly a poor crop and the *bājri* crops were each comparatively poor. The experimenter says; "The selection of crops was a matter of some difficulty this year; the rainfall has been everywhere in the Pimpalner taluka scanty, and so capricious that even in one village some crops have proved almost total failures; whilst in another field the same crop has yielded results below the average, but still not bad. The crops selected were good representatives of the more successful fields."

The sesamum was threshed after nine days' and the *bājri* after two days' exposure to the sun. Mr. DuBoulay did not see the crops threshed owing to pressure of work; he deputed a clerk, in whom he had confidence, to do the work.

Each field tested has poor light soil, the sesamum field being the poorest. Crops on this description of soil would readily fail in a year of deficient rainfall. The fields grow cotton on occasion, but the principal crops are *bājri* and *tīl*. *Bājri* fields were lightly manured before sowing with sheep manure. *Tīl* was sown seasonably in July, but *bājri* later than usual in August.

I tabulate outturn, &c., results as under :—

	Anna- Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percent- age In- cidence of Assess- ment.
		Principal Product.	By- Product.			
		As.	Lbs.			
Experiment No. 33 ...	8	61	...	3 5 4	0 5 9	10.78
„ No. 34 ...	6	302	800	7 8 0	0 7 1	5.90
„ No. 35 ...	4	318	800	7 8 7	0 6 9	5.59

The *tīl* anna estimate is probably too high and the *bājri* estimates too low. The results are indicative of what poor soil in an unfavourable season will produce.

Mr. DuBoulay also submits three dry-crop wheat experiments (Nos. 36—38) from the Sháháda taluka. The outturn is in every case poor and in one case miserable. The rains failed to a very serious extent, and the wheat crop especially suffered; other rabi crops would, of course, also suffer. I regard these experiments as decidedly useful. Mr. DuBoulay says: “The first two crops were selected rather for my private edification than for the purpose of supplying statistical information. They were chosen as representing to my untutored eye the kind of crop which the villages along the Tápti have harvested in this year of drought. The first represents the general average crop in the affected area, the second represents the worse crops which covered a considerable area there. I mentally catalogued them as a 4-anna and a 2-anna crop; the results show that my mental estimates are unreliable. As regards the third crop, I selected it as showing a fair average specimen for the whole Sháháda taluka this year.” These experiments are, as I have observed, very useful, provided that the peculiar conditions are clearly stated.

The first field is said to have had 17 cart-loads of cow-dung per acre before sowing. The others were unmanured. It is doubtful whether the manure applied had any beneficial effect on account of the drought. The soil in all the three fields is black, but not quite pure black soil in the third field. The land sloped slightly and the people called it *berad kálí* or *ráichikan*. The season was very bad. The variety of wheat is *gore gahu* or white wheat.

Details of outturn, &c. :—

	Anna- Estimate.	Outturn of Grain per Acre.	Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assess- ment.
	As.	Lbs.	Rs. a. p.	Rs. a.	
Experiment No. 36 ...	4 to 5	329	7 13 11	2 13 1	35.80
„ No. 37 ...	4	68	1 7 9	2 12 8	188.07
„ No. 38 ...	11	342	10 3 0	2 5 7	23.05

The experimenter gives the anna estimate according to the owner's statement, but he himself thinks the correct estimates are 4, 2 and 8 annas. The seed-rates vary from 76 to 95 lbs. per acre and are above average. The seed sown exceeded the outturn in the second test.

Wheat is sold in Khándesh by the *máp* of 384 *sers*. The price rapidly rose after harvest owing to the poor crops. It varied from Rs. 12 to 20 per *máp* during the season. In the first test Mr. DuBoulay values the grain at Rs. 15 per *máp* or 47½ lbs. per rupee, in the second at Rs. 12 per *máp* or 57½ lbs. per rupee, and in the third at Rs. 18 per *máp* or 38½ lbs. per rupee. The grain in first and second tests is valued at a cheap rate for an average year and is not dear as valued in the third test. Wheat brought by Banjáras and others from Western Khándesh was selling last March at Navsari at from 23 to 25 lbs. per rupee.

Mr. G. W. Hatch, Assistant Collector,

Sends four tests exactly according to the prescribed programme. His first experiment (No. 39) was on *bájri* near Bhusával on the light and poor land broken by *nálas* which throughout the district borders on the Tápti river banks. No manure was applied and the cultivation is termed indifferent. The crop was a poor one and Mr. Hatch adds that the *bájri* throughout the eastern part of the district has been very poor and in some places it has entirely failed owing to the drought of August and early September. The land grows *jowári*, cotton and *bájri*. The outturn of grain was 259 lbs., which is priced at 24 local *sers* or 43 lbs. per rupee. By-products at 480 lbs. per rupee. The assessment is Re. 1-12-1 per acre and the incidence works out to 18·80 per cent.

The second experiment on *bájri* taken at Jalgaon Kasba is not of much value, as it does not represent anything like the ordinary *bájri* crop. The experimenter explains that he left this experiment so late that there was no other field, and this field suffered even more from want of rain than the first field. The seed was sown in the middle of August and Mr. Hatch says that probably there was no rain for three or four weeks after sowing and a good deal of the seed never germinated. The experimenter reports that the field was exceptionally bad for an experiment. The value of the yield was only Rs. 5-13-9 per acre and the incidence of assessment 36·53 per cent. I do not report the results in the tabulated statement.

The experiment (No. 40) on sesamum (white *tíl*) forms a contrast to the *bájri* tests. The field, a black soil one, grows cotton, *tíl*, linseed and *jowári*. It was dressed with farmyard manure at the rate of 7½ cart-loads per acre before sowing. Mr. Hatch does not believe this statement. *Tíl* on deep black soil can withstand drought better probably than any other crop, and the absence of rain in August-September probably did the crop no harm. The outturn of seed came to 460 lbs. per acre and the incidence of assessment to 4·54 per cent. The price of the grain, at 12 *sers* of 59 *tolas* each per rupee, comes to 18½ lbs. the rupee.

This officer's fourth test (No. 41) was on unirrigated wheat, *Bansi*, grown on a black soil field at Varangaon in the Bhusával taluka. The field is said to be manured every third year and the present is the third crop since manuring. Seed-rate 80 lbs. per acre is high according to the formulæ and Mr. Hatch states that it is hard to find out the truth. The formula of 32 lbs. is generally exceeded in Khándesh. The wheat crop both in the field and throughout this part of the district is considered only a 4-anna one. Outturn is given as 236 lbs. per acre grain and 240 lbs. *bhusa*. Mr. Hatch values the grain at 2 annas a *ser*, apparently a retail price, or 29½ lbs. per rupee. The by-product, *bhusa*, is valued roughly at 160 lbs. per rupee. The incidence of assessment comes to 34·81 per cent. on Rs. 3-5-6 per acre of assessment.

Mr. Shitárdm Dámodar, District Deputy Collector,

Submits three experiments, two on *bájri* and one on sesamum. Two of the fields were selected in the Dhulia taluka, the third in Amalner taluka. The season for each crop is described as favourable. The *bájri* tests may be contrasted.

The first field has *barad* soil manured every third year with homestead manure. The crop got 10 loads per acre. The field grows *jowári*, *bájrí* and cotton, the cereals with the usual subordinate mixtures. The *bájrí* experimented upon was apparently grown alone. The assessment, original survey, is Re. 0-10-2 per acre. The second *bájrí* field has reddish soil and bears a revision assessment of Re. 0-9-5 per acre. Manure is never applied. The field grows *bájrí* and cotton and gets sufficient tillage, as it is free from *kunda* and *hariáli*. These grasses if once established are troublesome weeds. In the first field $11\frac{1}{2}$ lbs. seed per acre was sown, in the second $9\frac{1}{4}$. These are about average rates. Each crop was seasonably sown in June and reaped early in October.

The outturn, &c., results are as under :—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		Principal Product.	By-Product.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
1st field (manured) ...	14	459	853	11 4 10	0 10 2	5.62
2nd field (never manured).	12	325	1,892	13 1 2	0 9 5	4.50

The sesamum crop tested by this officer yielded exceptionally well. The field has middle class black soil and bears an assessment, original survey, of Re. 0-10-8 per acre. The crop is said to have been manured with 20 loads ordinary manure per acre. The seed was sown in June, the crop ripened in October and yielded 554 lbs. seed per acre worth Rs. 34-2-11. The percentage incidence of assessment is only 1.95.

I do not enter any of this officer's tests in the tabulated statement because there is considerable doubt as to the accuracy of the reported figures. The tests were taken in October 1895, and the reports submitted full nine months afterwards. There are large discrepancies between the weights of local *sers* as reported by the experimenter and as found in my office. The respective weights are :—

Experiment.	Weights reported by the Experimenter.	Weights found in Director's Office.
	Tolas.	Tolas.
1 (<i>Bájrí</i>)	150 $\frac{1}{2}$	163 $\frac{1}{4}$
2 (<i>Sesamum</i>)	115	158
3 (<i>Bájrí</i>)	144	155 $\frac{3}{4}$

Mr. F. B. Young, Superintendent of L. R. and Agriculture, C.D.,

Sends two *jowári* tests (Nos. 42 and 43). Each field grew a pulse subordinate to the *jowári*, *udid* in the first field and *mug* in the second. The pulses were harvested before the test areas were selected, therefore their outturn is unknown and the experiments for this reason are somewhat unsatisfactory. Both fields are service *Ináms*. There are six shareholders in the first field and four in the second field by right of inheritance. Mr Young remarks that the first field is never manured owing to ill-feeling between the sharers and has not been ploughed for 6 or 7 years. The heavy harrow (*vákar*) was used three times before sowing. The crop was bullock-hoed with the *kolpa* four times at intervals of a fortnight, the first hoeing being given 3 weeks after sowing. The rows were also

hand-weeded by women and the field was free of weeds. About 7 lbs. of seed per acre sown in July produced a crop which ripened late in November. The field grew cotton, *jowári*, wheat, linseed and *bájri*, rotated with each other in rather an irregular manner. The season was fair. The second field did not give a better crop notwithstanding an application of 8 or 9 loads of manure applied per acre in May. The rotation is the same in both fields. The soil is black, but faulty in parts. On these portions the crop was poor and a few of the heads of grain diseased. Half the field grew linseed this year, $\frac{1}{4}$ was under the tested crop and $\frac{1}{4}$ waste or under grass. The *jowári* portion was ploughed in the fair season and subsequently repeatedly harrowed. It was bullock-hoed and weeded much in the same manner as the first field. The grain got from the first field was superior to that of the second, being heavier per measured *ser*; both are valued at the same rate, therefore the inferior sample is dearer weight for weight.

The outturn, &c., results of both fields are :—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.	Remarks.
		Principal Product.	By-Product.				
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.		
Experiment No. 42	18	566	4,975	20 13 0	2 7 1	11·73	Unmanured field.
Do. No. 43	19	591	3,675	20 10 0	2 5 6	11·86	Manured field.

The anna estimates are, I think, too high.

Na'sik.

Mr. Stewart was asked to take one experiment each on *bájri*, *jowári* and cotton. He could not do the last. The reasons put forth by Mr. Kábráji for his failure to do any experiments have been regarded by the Collector as unsatisfactory. Mr. Thatte carried out the programme, but his *rági* and *bájri* experiments have been rejected for reasons given below.

Mr. R. B. Stewart, Assistant Collector,

Submits two tests, one on *bájri* and another on *jowári*. The former gives exceptionally good results.

The *bájri* field (Exp. No. 44) has black soil and is irrigable from a *bandhára*. It bears a consolidated assessment for soil and water of Rs. 8-8-0 per acre. The field grows second crops of gram and *methi* after a rain crop of *bájri*. The second crop in ordinary years gets apparently a full advantage of water; this year the early rain was scant and the *bájri* was regularly irrigated. The *bájri* was only lightly manured, 3 loads of cattle-dung per acre having been applied in June. The seed was sown on the 10th July. The crop ripened late in October. The grain is valued at the cheap rate of $62\frac{1}{3}$ lbs. per rupee. The crop yielded per acre 1,578 lbs. of grain and 5,610 lbs. useful by-product together worth Rs. 28-9-6. The incidence is 29·79 per cent.; this is moderate in as much as the whole of the water-rate is included in the assessment, and the water in ordinary years will presumably be most useful for the second crops only.

In answer to a reference, Mr. Stewart says that the *bájri* crop was exceptionally fine. The anna valuation should, I think, be 20. Mr. Stewart also says that the Mámlatdár of Málegaon reports the *bájri* rate at the end of October Rs. 4-11-10 per maund and adds: "This is the Bazár rate for buying, not the rate a Kunbi gets when selling, but it may be accepted, as probably the man would not sell the *bájri* as he had little." At this rate, about $48\frac{1}{2}$ lbs. per rupee, the value of the crop comes to Rs. 33-4-4 and incidence of assessment to 25·54 per cent.

Shálu jowári (Exp. No. 45) tested by this officer gave poor results due to the failure of the late rains. The crop was locally estimated as a 6-anna one. It was more deficient in grain than in straw. The field has black soil and grows linseed and *jowári* in alternate years. The assessment is Re. 1-1-5 per acre. The seed was drilled in October, the seed-rate $2\frac{1}{2}$ lbs. per acre being much under average. The crop was ready in about 3 months and only yielded 118 lbs. grain and 1,200 lbs. useful by-products per acre worth Rs. 5-12-6. The incidence works out to 18·82 per cent. Although the figure is high it does not prove that the burden of assessment is heavy in an average year.

Mr. C. M. Thatte, District Deputy Collector,

Reports one test each on *nágli* and *bájri* and two on groundnut.

The *nágli* experiment was made on red stony *mál* land assessed at annas 5 per acre. The field during the last four years grew two crops of *nágli*, one of *khurásni* (niger seed) and was one year waste or fallow. The seed-bed was rábed liberally with cow-dung, branch wood and dried grass. The outturn figures, *viz.*, 1,065 lbs. grain and 944 lbs. straw, &c., per acre, represent a fair good crop for this class of land, but I cannot report this test. Mr. Thatte was engaged at harvest time with special audit of accounts and entrusted the *Mám-latdár* to select test areas in two fields and also to cut and stack the crops. Subsequently Mr. Thatte saw the produce of the test areas threshed, winnowed and weighed. The results of one of the tests are not reported for reasons not given.

Mr. Thatte's *bájri* test is also rejected. He selected a field from which the crop had already been harvested and stacked. On hearsay evidence he assumed that a particular stack contained the exact produce of a particular area. This may or may not have actually been the case. It would have been difficult to determine the exact area on which the *bájri* grew. The crop only occupied a small portion of a large number. Mr. Thatte says: "I employed 80 men to cut off the ears of the stacked bundles. They took nearly half an hour to do this." It is certain that so many men could not have been got for the work except under compulsion. They were either inadequately paid for their trouble or the experiment cost Government much more than it ought to have done. In any case the employment of so many men for such simple work must have appeared farcical to the owner of the field and other ryots and was calculated to increase that hostile feeling against crop experiments which is already more or less general.

Mr. Thatte's groundnut tests (Nos. 46 and 47) are not in all respects satisfactory. The first crop was harvested before it was quite ripe. The nuts were allowed to dry for only three days before being weighed. The second field was harvested dead ripe on the 11th of January, exactly a month after the first field. The nuts were allowed to dry four days before weighing. The principal product in each case is valued at the same rate in lbs. per rupee. The nuts of the first field when shelled gave 66·6 per cent. kernels. Those of the second field 69·4. The haulms (leaves and stems) of the first crop would probably be more or less green at harvest time, and would certainly be more valuable as fodder than the same by-product in the second field. The by-product in each case is valued at Rs. 8 per acre. Mr. Thatte again collected a large number of men to harvest his test areas, 80 men being employed one hour in the first field and 40 men $2\frac{1}{2}$ hours in the second field. A large number of labourers must necessarily be employed for a groundnut test, because the work is tediously slow. Yet I think less than 80 might very well have sufficed.

Each field has black *Bágayat* soil. The first field is irrigable by well and *pát* water, the second by *pát* water only. The first field grew onions, groundnut and *bájri* during the last three years. In the second, onions, groundnut and wheat were grown in the same period. The *pát* water of the second field apparently lasts during the cold weather, otherwise wheat and onions could not be grown. Each of the tested crops were broad-casted; this probably means that the seed was sown by hand behind the plough. This is a common method of sowing the crop. The seed-rate of the second field, 60 lbs. per acre, is high,

The fields were liberally manured with ordinary manure in May.

Outturn, &c., results are as under :—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		Principal Product.	By-Product.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
Experiment No. 46 ...	8	1,456	2,761	43 1 0	2 13 0	6.53
„ No. 47 ...	8	1,543	2,976	45 2 2	3 8 6	7.82

Ahmadnagar.

Experiments on *jowári* were ordered from this district, Mr. Sorábji conducted only two tests. Mr. Simcox's omission to experiment has not been explained. Other officers have followed the programme.

Mr. F. B. Young, Superintendent of Land Records and Agriculture, C. D., did one test on *jowári* and one on wheat in this district.

Mr. Sorábji Padamji, Assistant Collector,

Sends two tests (No. 48 and 49) on *shálu jowári*. Each crop had subordinate rows of safflower (*kardai*). The oil-seed came to nothing in the first field and barely yielded the seed sown in the second. The subordinate crop was, however, not actually tested. The season was unfavourable. No rain fell after sowing. The first test was taken on *barad* or *mál* land, the second on a black soil field. The *mál* land is said to have suffered least from want of rain. This I do not understand. No manure was given to either field. If due count is taken of the character of the season, the results tabulated below must be considered quite satisfactory :—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.	Remarks.
		Principal Product.	By-Product.				
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.		
Experiment No. 48 ...	8	471	1,260	11 9 0	0 8 9	4.73	Barad soil field.
„ No. 49 ...	8	392	1,297	9 13 6	0 14 10	9.42	Black soil field.

The superior holder of the first field has sublet it to a tenant. The owner pays the assessment, gives the tenant $\frac{2}{5}$ th of the seed required, and takes $\frac{3}{5}$ th of the produce.

Mr. R. C. Brown, Assistant Collector,

Sends three experiments on *jowári*. They were all taken on the same day, at the same village and in fields quite close together, and the conditions of season, cultivation and soil are the same. The soil was brownish with stones. The cultivation is good because the land was well ploughed. No manure was applied to any of the fields. Rainfall was insufficient. Each *jowári* crop has safflower subordinate to it, and the safflower was also tested. Mr. Brown says he does not think the fields would ever produce much better crops. That means that the crops are 16-anna ones, but Mr. Brown gives the anna valuations as 8 for the first and 10 for the other two. The crops are said to have been fairly typical of the crops round Párner. The fields grow *báiri* and *jowári* alternately. Mr. Brown gives very meagre notes. Seed-rates given are 6 lbs. 6 *tolas* for the first field, 4 lbs. 4 *tolas* for the 2nd, and 36 lbs. 36 *tolas* for the third.

I cannot accept the last as accurate. It is six times the average, and there is no indication of any necessity for so much seed. Seed was drilled with a *pábhār*.

Outturn figures are :—

	OUTTURN PER ACRE.			Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assess- ment.
	Principal Product.		By- Product.			
	Jowári.	Safflower.				
	Lbs.	Lbs.	Bundles.	Rs. a. p.	Rs. a. p̄.	
Experiment No. 50 ...	338	3½	325	10 0 4	0 6 0	3·76
„ No. 51 ...	470	1½	390	12 13 5	0 8 7	4·17
„ No. 52 ...	404	14¾	350	11 12 4	0 4 6	2·43

Mr. Brown has made his calculations at rates of one *ser* equal to 109½, 114½, 112½ *tolas* in the three tests. The weights found in this office were 106½, 108, 105 *tolas*. These are serious discrepancies and throw some doubt on the results arrived at.

Mr. L. M. Deshpande, District Deputy Collector,

Submits two late *jowári* tests.

The first field (Exp. No. 53) was black *gavháli* or wheat-growing land. The early rains were good and abundant, but the later rains failed and the crop was affected. Outturn, however, is very good. Local anna estimate is 12. No manure was applied. The seed was drilled with a *tiphan* late in September. Safflower was subordinate, but it appears to have failed almost entirely.

The second field (Exp. No. 54) was of *keota* soil, apparently alluvial deposit, growing wheat, *bájri*, &c. The season was as above, and the cultivation was good. No manure was applied. The subordinate safflower here, too, came to nothing. Anna estimate is 8, which is possibly rather low.

Mr. Deshpande began another test (No. 55) on *jowári* when he was relieved by Mr. Vádekar, who finished and sent in the experiment. The soil is brown *mál* soil, and the field grows *jowári* and *bájri* with subordinate crops of safflower, &c. Manure has never been applied to the field within the memory of man. The season was not very good, as the rainfall was scanty. Cultivation was good. Five pounds seed were sown per acre late in September with a *tiphan*. Safflower appears to have come to nothing. The *jowári* outturn is not very good, but I fancy it is more than the 8-anna crop which it is said to be. There is a tendency for experimenters to consider a 16-anna crop as a bumper one, even when they know that it should be regarded as an average one. Mr. Deshpande, for instance, says “the season for *jowári* was a good one,” and further on, “the average crop of *jowári* for the *táluka* was set down as a 12-anna crop.”

Outturn, &c., per acre of these three fields are :—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		Principal Product.	By-Product.			
		Lbs.		Rs. a. p.	Rs. a. p.	
Experiment No. 53 ...	12	1,193	{ 3,250 kadbi 220 chaff ... }	{ 22 6 3	0 14 3	3·97
„ No. 54 ...	10	759	{ 5,350 kadbi 262 chaff ... }	{ 19 11 1	0 14 4	4·55
„ No. 55 ...	8	409	{ 1,754 kadbi 200 chaff ... }	{ 14 4 5	0 13 0	5·69

Mr. F. B. Young, Superintendent, L. R. and Agriculture, C. D.,

Submits two experiments, one on *jowári* and the other on wheat, safflower and mustard.

The *jowári* (Exp. No. 56) was taken at Shevgáon. It is an irrigated crop and the outturn is enormous. Mr. Young says: “The cultivator considers the

crop a bumper one. Very few heads of grain were damaged by *kani*, a disease which few, if any, *jowári* crops escape, speaking from my own experience." The yield of grain was 3,595 lbs. per acre. No such yield has ever been reported before. I have never seen or heard of a crop even half so good. Mr. Young only cut 4 gunthas considering this a garden crop. It would have been better had he cut 8. He says the crop was fairly even. The field is friable blackish garden soil locally known as *sanvat*. The season was favourable and the cultivation good. The field was ploughed in the latter part of September with an eight-bullock plough, twice. It was then harrowed with a four-bullock harrow (*mogad*) and levelled with an *aut* or *kulav* drawn by two bullocks. A month afterwards it was again levelled and the seed was sown. The field is near the village. About 200 cart-loads of manure consisting of a compost of cattle droppings, ashes and refuse were put on in May, presumably to the whole field of $5\frac{1}{2}$ acres. Half the manure came from the cultivator's own animals and half some obliging friends gave him. It is unusual to meet with friends so obliging as this. The price of manure is said to be 4 annas per cart-load. Seed-rate is $20\frac{1}{2}$ lbs. per acre, which though a high rate may be accepted as correct. The seed was sown in November with a two-coulter drill, both lengthways and breadthways. The crop was irrigated from an old well built prior to the original survey. No water-rate is levied. Mr. Young makes the following remark :—"The registered occupant has mortgaged the number for Rs. 300 for 15 years, during which period no interest is to be paid, but the produce is to be enjoyed by the mortgagee, who has sublet the number to the present cultivator for 3 years for Rs. 75 per annum, assessment to be paid by mortgagee, and all cost of cultivation by cultivator, who owns 12 bullocks, 2 ploughs and all the necessary agricultural implements ; he also has a family of five sons and employs labourers only for weeding and harvesting. He also owns and cultivates two other numbers and cultivates another for his brother, who appears to be both lazy and lacking in funds." About half the area experimented on was this year sown first with *maka*, *mug* and *rála*,

Outturn, &c., per acre :—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		Principal Product.	By-Product.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
Experiment No. 56.	20	3,595	5,600 kadbi. 400 chaff.	86 3 0	1 4 5	1.48

Mr. Young's other test is valuable because it includes the subordinate crops of safflower and mustard. The field is black soil and it grows *bájri*, *jowári*, wheat (unirrigated), safflower, mustard, *tur*, gram, *hulga*, *udid* and linseed. The rotation is undefined, but generally *udid* with gram as a second crop is grown the season before wheat. Mr. Young remarks that the best portion of the crop, it was a little uneven and the experimenter cut four patches, was grown where gram was sown last season. Such black soil as is favourable for wheat is locally called *gavháli* (wheat-growing). As to the cultivation, Mr. Young describes it as good and says : "The portion sown with *bájri* in 1894-95 was ploughed (6 bullocks) in December 1894 and January 1895 ; the whole field was ploughed (4 bullocks) last September, a fortnight afterwards it was harrowed with a *kulav* (4 bullocks) and again a week afterwards with a *kulav* (2 bullocks) ; the field was then weeded and the soil loosened with a *pharát* (2 bullocks) before sowing which took place in October, the *pharát* following the drill at the time of sowing. The field was free from weeds."

The area under gram, about $\frac{1}{4}$ th of the whole, was manured before sowing in 1894-95 (7 cart-loads) and half the field was manured this season with 15 cart-loads. Half the manure was homestead manure and half purchased at 8 annas a cart,

Of the owner Mr. Young says: "The registered occupant owns and cultivates $\frac{3}{4}$ of this number, the remaining $\frac{1}{4}$ is owned and cultivated by his nephew. The former is the registered occupant of 42 acres assessed at Rs. 73; the produce of his fields, after supplying the requirements of his family consisting of himself, wife, 4 sons, their wives and children, leaves a surplus which is taken to Ghoti, a large market village with a railway station in the Igatpuri taluka. The field under experiment came into the present occupant's possession by virtue of a mortgage for Rs. 900 and the addition of Rs. 500 paid later on to the widow of the original owner. The mortgagee cultivated and enjoyed the produce of the field as interest on Rs. 900."

Outturn, &c., per acre:—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		Principal Product.	By-Product.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
Experiment No. 57 ...	16	504 wheat ... 21½ safflower. 4 mustard.	800	20 8 2	1 9 9	7·84

Poona.

Experiments on rice, *bājri*, *rāgi* and gram were selected for this district, and the programme was carried out in its entirety.

Mr. H. W. J. Bagnell, Assistant Collector,

Reports three experiments, one on rice, one on *rāgi* and one on mixed *bājri* and *jowāri*. They are none of them quite satisfactory.

In the rice experiment (No. 58) the sample received gave 73 *tolas* to the *ser*. Mr. Bagnell states that 79 *tolas* go to the *ser* and can only account for the difference by dryage. This is unsatisfactory because it is not clear whether the experimenter's figures should be altered or not. It is better to leave them as they are. The field measures 1 acre 14 gunthas and is assessed at Rs. 5 or Rs. 3-11-3 per acre. The soil is known as *pāndhri burki*; this is a comparatively light description of soil suitable for inferior sorts of rice in years of favourable rainfall. The field only gets manure once in four years and the outturn results are therefore as good as the cultivator could have expected. The season was on the whole favourable. The crop was grown from seedlings transplanted from a seed-bed rābed with cow-dung and grass. The quantity of rāb materials is not given, nor is the proportionate area of seed-bed to acre of transplantation. It is not clear therefore how the experimenter determined the per acre seed-rate which is stated to have been 90 lbs per acre. The outturn, 1,266 lbs. grain and 3,360 lbs. straw per acre, is valued at Rs. 24-13-1. Incidence works out to 14·92 per cent. The straw is valued at the cheap rate of 12 cwts. per rupee.

The experiment on *nāgli* (No. 59) was done on the same day at the same village and, judging from the fact that one field is Survey No. 279 and the other Survey No. 284, almost in exactly the same place. The field of this experiment has grown *nāgli* four times in the last 5 years and *til* once. The crop is estimated at 16 annas. Bhikāris are said to camp on the land with their animals during the three hot weather months, but beyond that no manure is applied. Perhaps that is enough. Nine pounds seed per acre were sown in a rābed bed; amount of rāb materials and area of bed not given. Outturn is 903 lbs. grain and 1,370 lbs. straw per acre, worth Rs. 19-8-9. Assessment is Re. 0-14-5 per acre and incidence 4·61 per cent.

Mr. Bagnell's third experiment (No. 60) is on *bājri* sown with *jowāri*, not a common mixture. Twelve *ser*s of *bājri* and one of *jowāri* (28 lbs. mixed seed)

are said to have been sown per acre. The seed-rate is extremely high. The soil is deep mixed black. Mr. Bagnell could not find any *bájrí* unmixed with any other crop, though he went "from one end of the village to the other." The field is said to grow *bájrí* and gram every year. Presumably this means that the land ordinarily is double cropped every year. The soil is therefore probably of rather high class quality. The experimenter says 200 cart-loads of manure were applied to $7\frac{1}{2}$ acres of land at Re. 1 per cart-load, adding that it is impossible to gauge the truth of this statement, but it seems a great exaggeration, seeing that manure at this rate would cost Rs. 26 per acre and the gross outturn is only Rs. 24; it seems safe to assume that the statement is clearly wrong and that a much lighter dressing was probably given. The grain outturn was 672 lbs. *bájrí* and 121 lbs. *jowári* per acre valued at Rs. 20-5-0. The straw is valued at Rs. 3-12-0 and weighs 3,040 lbs. The two kinds ought to have been separately shown, as *jowári kadbi* is much more valuable than *bájrí* straw. The incidence works out to 6·08 per cent.

Mr. G. Carmichael, Assistant Collector,

Sends three experiments—one on *bájrí*, one on *náglí* and one on gram. The samples of grain received here showed differences from the recorded weights thus:—

Crop.				Weight recorded by Experimenter.	Weight found in Director's Office.
				Tolas.	Tolas.
<i>Bájrí</i>	...	...	...	95	91 $\frac{1}{2}$
<i>Náglí</i>	...	...	...	89	84
Gram	...	...	...	99	97 $\frac{3}{4}$

Mr. Carmichael suggests that the differences may be due to dryage, submits that he took some trouble to get the grain dry, and says that it was carefully weighed in his presence. Mr. Carmichael's recorded weights must be accepted, but it is much to be desired that these mysterious differences should not constantly occur. Mr. Carmichael's weights showed the same considerable differences last year. The experimenter's notes are very meagre.

For *bájrí* (Exp. No. 61) the season was unfavourable. The soil is medium quality friable black soil assessed at Re. 1-4-6 per acre, growing *bájrí*, ground-nut, *jowári* and wheat. In good years a second crop is got after *bájrí*. One ploughing and four harrowings were given to the land, but it was not very clean. No manure was applied.

Outturn, &c., per acre is:—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		Principal Product.	By-Product.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
Experiment No. 61 ...	6	323	1,380	10 2 6	1 4 6	12·61

The second experiment (No. 62) was on *náglí*. The main field was manured at the rate of 3 cart-loads of sweepings and cow-dung per acre and the seed-bed raked with 5 cart-loads of cow-dung covered with grass and rubbish. The season was unfavourable, and the crop was saved by the late rain. The soil is stony black soil (*mál jamin*) one foot above the rock. Seed-rate is given as 3 lbs. per acre, which is rather low.

Outturn, &c., per acre :—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		Principal Product.	By-Product.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
Experiment No. 62 ...	9	856	975	13 11 3	0 6 3	2.85

Gram is priced at 28 *sers* of 89 *tolas* each or 64 lbs. per rupee.

The third experiment (No. 63) was on gram, a second crop after *bajri*. The season was favourable, the cultivation good and the crop an average one for the village. The anna estimate is 10 as given by Mr. Carmichael. The soil is medium black inclined to be reddish. It grows *bajri*, groundnut, *jowari*, &c., and for the last three years has not grown, as this year it has, a second crop. The gram was drilled in immediately after the *bajri* was removed at the rate of 30 lbs. per acre. No manure was applied this year, but 15 cart-loads of sweepings and cow-dung were put on last year. The gram was twice irrigated from a *pât*. Of the whole field 1 acre 33 gunthas is assessed as Bágáyat at Rs. 2-8 plus Rs. 6 water-rate, or in all Rs. 4-6-2 per acre. Outturn comes to 635 lbs. pulse and 350 lbs. chaff per acre, valued at Rs. 18-2-8. Incidence, which, it must be remembered, is on the second crop only, works out to 24.14 per cent.

Shola'pur.

Each Assistant was asked to conduct experiments on *bajri*, linseed and sesamum. Mr. Kennedy could not do the *bajri* and sesamum tests owing to his detention at Bársi by outbreak of cholera, and selected gram and *tur* instead. Mr. Scott similarly chose gram for *bajri* for reasons not given.

Mr. B. C. H. Kennedy, Assistant Collector,

Submits 3 experiments, one each on linseed, gram and *tur*. The experimenter has made no use of the remark column. The samples of grain forwarded to my office gave an excess of 3, 6½ and 4½ *tolas* over the figures recorded in the three tests.

The linseed and gram tests (Nos. 64 and 65) were taken in the same village on the same day. The fields have each brown black soil. The linseed field bears an assessment of Re. 0-11-4 per acre and grows chiefly *jowari*. It belongs to a non-resident Sávkár, who cultivates it by hired labour. The gram field also belongs to a non-resident Sávkár, who has leased it for three years to a Marátha cultivator. The experimenter ought to have reported the terms of the lease. No manure was applied to either field. The season was fair. The cultivation is described as ordinary.

The outturn, &c., results are as under :—

	Anna Estimate.	OUTTURN PER ACRE.	Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.	Remarks.
		Seed or Grain.				
	As.	Lbs.	Rs. a. p.	Rs. a. p.		
Experiment No. 64 ...	10	348	16 13 3	0 11 4	5.57	Linseed.
„ No. 65 ...	8	387	9 2 11	0 13 7	9.24	Gram.

No count is taken of the by-product, which in the case of gram would be of considerable value.

The *tur* (Exp. No. 66) tested by this officer is said to have been sown in October and reaped in February. I fancy the crop was sown earlier. It is not a common practice to sow *tur* alone. The field has brown black soil assessed at Re. 0-9-10 per acre. The crop yielded well, but is only estimated as an 8-anna one. The outturn was 760 lbs. pulse per acre worth Rs. 15-15-0. Again the value of the by-product is neglected. The incidence of assessment is only 3·85 per cent.

Mr. G. Scott, District Deputy Collector,

Forwards an experiment on sesamum and a test on gram and another on linseed, all of which are reported with very few remarks.

The sesamum field (Exp. No. 67) is a large one of 25 acres 31 gunthas assessed at Rs. 6 or Re. 0-3-8 per acre. It is brown *māl* land. The rotation is undefined; crops such as *jowári*, *bájri*, gram, linseed, *tur*, &c., are grown. No manure was applied and the cultivation is described as indifferent. The crop is stated to be a 12-anna one when 16 annas is the maximum, or 16 annas according to the usual standard. 2½ lbs. seed were drilled in August and the crop was reaped in November. The outturn is 121 lbs. oil-seed per acre valued, at 18½ lbs. per rupee, at Rs. 6-10-8. Mr. Scott values the by-products at 10 annas per acre. In the report I have omitted this, as the by-products do not appear to be useful for anything but burning. Incidence works out to 3·44 per cent.

The sample *ser* of gram (Exp. No. 68) received weighed three *tolas* less than the recorded weight. The crop is said to be a 14-anna crop. The outturn is 429 lbs. pulse valued at Rs. 11-13-0, making the incidence 3·83 per cent. on an assessment of Re. 0-7-3 per acre. The whole field measures 26 acres 22 gunthas, of which 5 gunthas are *kharáb* and grows *bájri*, *tur*, *jowári*, &c. Eight cart-loads of farmyard manure per acre are said to have been put on the land before sowing, and about 26 lbs. of the pulse per acre were sown with a three-coulter drill in October. By-products are valued at 5 annas for the acre, but amount not stated, and the pulse at 37½ lbs. per rupee.

The linseed field (Exp. No. 69) has black soil. The number is large; it extends to 29 acres 3 gunthas and bears an assessment of Re. 0-11-6 per acre. The linseed was mixed with safflower; the latter was not tested. The experimenter says this is the first time linseed has been sown in this field. The season is called average and the cultivation indifferent. No manure was applied. The seed-rate is just under 21 lbs. per acre. This is high. The seed was drilled with a three-coulter drill in October. Mr. Scott says the safflower occupied one out of 8 gunthas, and he calculates his acre averages on the assumption that the linseed occupied 7 gunthas. As usual I prefer to bear in mind the fact that every eighth row was safflower and calculate the averages on the 8 gunthas.

Outturn, &c., per acre was :—

	Anna Estimate.	Outturn of Seed per Acre.	Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
	As.	Lbs.	Rs. a. p.	Rs. a. p.	
Experiment No. 69	11	219	11 10 11	0 11 6	6·16

Sa'ta'ra.

Eight experiments have been reported from this district. A test on rice, another on *rági*, and a third on wheat were to have been made by Mr. Rand, but he was away at Poona when the rice and *rági* were harvested, being engaged in examining at the Departmental Examination. So he submits all the three tests on wheat. Mr. Arthur carried out two experiments, one on gram and another on wheat. He could not manage to do more owing to heavy work. Mr. Shepherd did not experiment owing to his detention at head-quarters and later on his attachment to a survey party. Mr. Cursetji followed the programme prescribed,

Mr. W. C. Rand, Assistant Collector,

Submits three experiments on wheat, in each case a second crop. The experiments submitted are carefully worked out and reported.

First experiment (No. 70) was on spelt wheat or *Khapli*. The field is divided into three parts, Bágáyat, Jiráyat and Rice. The cultivator treats the Rice and Bágáyat portions as one. They together measure 1 acre, are assessed at Rs. 2 plus Rs. 2-8 for the water of a *pát*, which conveys water from a stream in an adjoining village; total assessment Rs. 4-8-0 per acre. The field has reddish soil. The cultivation is described as fairly good and the season moderately favourable. The rotation is undefined. Seed was sown in October.

The wheat was a second crop after *sáva*. The whole survey number was sown with *sáva* and after its removal 32 gunthas were sown with wheat, about 5 gunthas with barley and half a guntha with sweet potatoes and brinjals. The wheat was watered four times. No manure was put on the field this year. It is manured every three or four years, whenever in fact manure is available. The yield given is of grain husked.

The other two experiments (Nos. 71 and 72) were on *Pota* wheat, both irrigated from a *pát* and both second crops after rice. Season and cultivation good. Seed-rates in both cases very high, 136 and 156 lbs. per acre respectively. The area under wheat was 9 gunthas in the first and 6½ in the second, and when small areas are sown the amount of seed put on is always far above the average. The first field only received one watering as it is situated in such a position that the soil remains damp for a long time. There is a water-rate of Rs. 3 levied, but not on the portion of the field under experiment. About half of the area experimented on had been used as a seed-bed for rice, and 20 head-loads of loppings, 4 crates of *sáva* straw and 25 baskets of house refuse had been burnt on it. No further manuring was done to the wheat. Mr. Rand does not say whether the second field was watered for the wheat or not. He merely says that it is well situated for holding water. It was probably watered once or twice. There is no water-rate. Before the rice 10 baskets of cow-dung were spread over 6½ gunthas, and the land experimented on formed part of that area.

Outturns are contrasted below ;—

	Anna Estimate.	Outturn of Grain per Acre.	Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.	Remarks.
	As.		Rs. a. p.	Rs. a. p.		
Experiment No. 70.	16	485	19 5 6	4 8 0	23-26	Khapli wheat.
Do. No. 71.	16	659	20 7 7	2 12 1	13-45	Pota wheat.
Do. No. 72.	18	934	28 1 6	5 9 11	20-00	Do.

Considering that these are all second crops the assessment seems moderate. It is a pity that the double crops could not be tested,

Mr. S. R. Arthur, Assistant Collector,

Reports an experiment on gram and another on wheat. Neither are quite satisfactory, in as much as the weights of sample *sers* as found in my office differ from those reported by the experimenter; and again the weights reported differ from those on which the calculations of acre averages have been based. The differences are shown below ;—

Crop.		Weight of sample reported by the Experimenter.	Weight of sample on which calculations are based.	Weight of sample found in Director's Office.
		Tolas.	Tolas.	Tolas.
Gram	...	119	105	123
Wheat	...	123	110	127

The gram experiment was taken on a field which usually grows *jowári* and *bájrí*; the former sometimes grown alone, sometimes with subordinate rows of *tur*. The kharif season was this year unfavourable and the *jowári* and *bájrí* outturn was poor. The late rains were abundant and this induced the occupant to sow gram as a second crop. The field has red soil assessed at Rs. 2-4-0 per acre. It is ploughed every year and, before the kharif crop was sown, was this year manured with 5 loads cow-dung per acre. The season was favourable and cultivation good. The seed-rate, 86 lbs. per acre, is overestimated. Half the quantity would be ample. The seed was drilled in November. The crop ripened in February and yielded 410 lbs. pulse worth, with the by-product, Rs. 12-3-2 per acre.

The wheat experimented upon was a second crop after rice. The field was manured for the rice, but not directly for the wheat. The preparatory tillage for the rice is fully described; that for the wheat is not, but it is described as good. Presumably the land was ploughed after the rice was reaped. The wheat was drilled late in November at the rate of 86 lbs. per acre, which is rather a high seed-rate. The crop ripened early in March. Meantime, it was three times irrigated. It yielded 903 lbs. grain and 1,490 lbs. useful by-product, together worth Rs. 36-12-10 per acre.

The percentage incidence of assessment works out for the gram and wheat respectively 18·44 and 15·68. There is, however, considerable doubt as to the accuracy of the reported outturn figures, and for this reason the figures are not entered in the tabulated statement.

Mr. J. M. Cursetji, District Deputy Collector,

Conducted three experiments, one each on groundnut, gram and *jowári*. The reports are drawn up with great care. In each case Mr. Cursetji estimates the cost of cultivation. He at the same time refers to the well-known tendency of cultivators to give to Government officers exaggerated estimates of outlays incurred in raising their crops.

The first experiment (No. 73) was taken on groundnut, which occupied a portion of a large number which is irrigable from a *dhara* and also from a well. The number extends to 9 acres 15 gunthas, of which 2 gunthas are *Pot Kharáb*. The Pátasthal rate for the field is Rs. 15 and the soil-rate Rs. 12. This gives an assessment for soil and water combined of Rs. 2-14-4 per acre. The area under groundnut has gradually increased during the last four years, indicating, the experimenter thinks, that the crop is probably quite as profitable as the other crops of the rotation. This is probably a fair inference.

A portion of the field is usually double-cropped every year, millet (presumably Italian millet) being grown as a kharif crop followed by cold weather irrigated crops such as garlic, *ratálu*, wheat, onions, carrots, brinjals, gram, &c. Sugarcane was grown in each of the last three years. Chillies, on a small area, are grown each year. This crop and groundnut are the sole crops of the year on their respective areas. The groundnut tested was well manured by folding sheep and by the direct application of ordinary manure before sowing. The preparatory tillage was very careful. The seed was sown by hand, a common practice, but the seed-rate reported, 108 lbs. per acre, is quite double what is usual. The crop was irrigated four times by *pát* water and twice from the well. The season was unfavourable in as much as no rain fell when it was most wanted, and the late rains were so heavy that the crop was damaged. The crop is estimated at 8 annas. It was sown in June and ripened in January and yielded 1,547 lbs. nuts in shell per acre. This outturn, with the by-product, is valued at Rs. 72-5-2 per acre. The market rate for groundnut in shell, viz. 34 lbs. per rupee, is decidedly high. The experimenter's estimate of cost of cultivation indicates that the crop was grown at a profit of Rs. 8 per acre. Mr. Cursetji argues that as this was the case for a poor crop, a full average crop must necessarily be much more profitable.

This officer's second test (No. 74) was taken on gram. The crop is estimated at the average standard. The field has a Jiráyat black soil and bears an assessment of Rs. 1-11-0 per acre. It grows chiefly *jowári* and *bájrí* as rain

crops, and wheat, linseed and gram in the rabi season. Small patches of tobacco, groundnut, carrots, &c., are occasionally grown, but are not helped by irrigation. In 1894-95 gram was grown as a second crop after *bājri*. Usually, however, no part of the holding is double-cropped. The area under gram was manured with ordinary manure at the rate of 8 loads per acre, also by folding sheep. Manure is reported to be given every second year, probably it is given at longer intervals. The experimenter debits the tested crop with half the value of the manure applied, and his estimate of cost of cultivation indicates that the crop was grown at a loss. Half the value of the manure is about equal to half the value of the crop, and the seed said to have been sown is about $\frac{1}{3}$ th of the outturn. The seed-rate, 114 lbs. per acre, is more than double what was required. The estimated cost of manure also probably much exaggerated. The season was unsatisfactory, because the late rains came very late and were far too heavy. The latter circumstance ought to have had a beneficial effect on rabi crops unless young seedlings were actually destroyed by the heavy rain. The crop yielded 640 lbs. pulse and 584 lbs. useful by-product, together worth Rs. 17-2-6 per acre. The incidence of assessment works out 9·83 per cent., which is perhaps high for a well-manured crop.

Mr. Cursetji's third experiment (No. 75) on irrigated *shālu jowāri* gave, like Mr. Young's test in Khándesh, exceptionally good results. The crop yielded 3,069 lbs. of grain and 8,004 lbs. of useful by-product per acre. The sample of *jowāri* weighed 99 *tolas* in my office as compared with 110 *tolas* reported. It is possible that the outturn therefore ought to be reduced by $\frac{1}{10}$ th. Moreover the grain is valued at the high rate of 36 lbs. per rupee. The gross value of the crop is shown by the experimenter at Rs. 105-12-1. Probably Rs. 80 per acre would be nearer its actual worth. The field is small, 1 acre 26 gunthas. The soil assessment is Re. 1-2-7 per acre. Water is got from the Yerla right bank canal. The irrigation rate varies with the crop. Rs. 2 per acre is charged for rabi *jowāri*. The soil is black. The field was heavily manured with ordinary manure and by sheep folding. The preparatory tillage and interculture were carefully attended to. The crop was only twice irrigated. The value of canal water for irrigation associated with careful tillage and liberal manuring is well shown in the exceedingly satisfactory outturn results. Mr. Cursetji's estimate of cost of cultivation indicates that the crop was grown at a net profit of Rs. 49 per acre. The Khátedár owns, in addition to the field tested, other lands extending to about 9 acres. The family consists of the cultivator, his wife, two daughters 15 and 10 years old, one son aged 4 years and one hired servant.

SOUTHERN DIVISION.

Belgaum.

Each sub-divisional officer was asked to do at least three ordinary tests and one special if possible. The First Assistant Collector made no experiments owing partly to detention at head-quarters on account of pressing magisterial work and partly to frequent changes in the personnel. Mr. Westropp carried out three tests, one each on *jowári*, *bájri* and gram, and Mr. Soman did two on *jowári*, one on gram and one on cotton.

Mr. J. L. Lushington, Superintendent, Land Records and Agriculture, S. D., conducted three tests required of him in this district.

Mr. A. Westropp, Assistant Collector,

Submits three experiments, one on *jowári* and *matki*, one on *bájri* and one on gram. The experimenter calls the crops 10, 8 and 11-anna ones. With regard to the first experiment Mr. Westropp says: "An average crop for the season was taken which was probably also the average crop of the particular field." The experimenter further says of the crop: "It was estimated by a Panch at a 10-anna crop, a true 16-anna crop being obtainable from the particular field under very favourable circumstances." Similarly the *bájri* is called an 8-anna crop and "the best crop the field would produce a 12-anna one." The crops tested are therefore 14 and 13-anna ones respectively according to the recognized method of estimating. The gram was about 16 annas. Experimenters should note that for the sake of comparison there must be a consistent and recognized system for the anna valuation. The system to be followed may be defined by stating that an average full crop which any field produces is called a 16-anna crop.

For all the fields the season was good except that for the *jowári* and *bájri* there was rather too much rain in September. The cultivation was 'not very good,' 'indifferent,' 'only fair'. The experimenter found the land weedy. Seed-rates are low; *jowári* 2½ lbs. with *matki* and *tur* ¾ lbs. each, *bájri* 4 lbs. with *kulthi* ¾ lbs. and gram 16 lbs. *Jowári* and *bájri* were drilled, gram sown by hand following the small plough in November. In the *jowári* experiment *tur* and *matki* occupied one line out of eight and seed was only allowed to fall into every alternate journey across the field made by the four-coultered drill. The owner said his land would not bear closer crops. It is a reddish light friable soil with a sprinkling of stones. Of *bájri* there were three lines to one of *kulthi*. The soil here was lighter but not so stony. The gram was grown on black soil.

Outturn figures are:—

				Anna Estimate.	Outturn of Principal Product per Acre.	Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
				As.	Lbs.	Rs. a. p.	Rs. a. p.	
Experiment No. 76	...	...	...	10	567 Jowári. 209 Matki.	23 13 7	0 15 0	3.93
Do. No. 77	...	...	...	8	314	9 4 4	0 9 1	6.12
Do. No. 78	...	...	...	11	357	11 0 0	1 12 3	16.05

The amount of the by-product for the first two tests is not given. There is none for gram. In the first case it consists of chaff, *jowári* heads, *kadbí* and unripe *tur*. The *tur* was cut as fodder unripe for fear of the village cattle eating it in the field. In the second experiment the *kulthi* outturn is only 7½ *seers*. Mr. Westropp has added one-tenth to the gram outturn for the place occupied by safflower in the third experiment. I have not entered this estimate in the table. Mr. Westropp cut only 4 gunthas in the second and third tests. I fear the areas were not large enough to get results which can be confidently called average.

Mr. N. C. Soman, District Deputy Collector,

Sends four tests, two on *jowári*, one on mixed gram and safflower and one on cotton. Orders were issued to experimenters to the effect that as far as possible unmixed crops should be tested. Apparently Mr. Soman did not understand the meaning of the orders. He says an entire survey number is seldom sown with one crop. "The usual practice is to sow a variety of crops, gram, wheat, cotton, safflower and *jowári*, in the same survey number." This is true but it does not follow that a crop occupying a portion of a survey number is unsuitable for experiment.

Mr. Soman's experiment on cotton is of little value, because the cotton had subordinate to it Italian millet and *ambádi* (hemp) which were both harvested before Mr. Soman saw the field. The value of these crops is estimated from hearsay evidence, but the valuation cannot be accepted as accurate. The cotton outturn alone is poor and the experiment is not reported. Mr. Soman ought to have had no difficulty in finding cotton growing alone in a portion of a survey number, if he could not in a whole survey number.

The *jowári* tests (Nos. 79 and 80) can conveniently be compared. The first field is generally overflowed by the Krishna when in flood, but was not this year. The soil is black; the season was favourable; the tillage good, but no manure was applied. The seed, about 4 lbs. per acre, was drilled late in August and the crop was reaped at the end of January. The second field has also black soil and was overflowed by a tributary of the Ghataprabha. A sprinkling of pulse had been sown, but the heavy crop of *jowári* killed out the subordinate mixture. The rainfall was all that could be desired for this crop. A little more in October and November would have been advantageous to the crop of the first field. Twenty loads of ordinary manure were given to the second field at the end of September after the floods had subsided. The seed was sown at the rate of 12 lbs. per acre in October and the crop was harvested on the 15th of February.

Outturn results, &c., are as under :—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		Principal Product.	By-Product.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
Experiment No. 79 ...	18.	472	930	14 6 8	0 15 9	7.13
Do. No. 80 ...	20	1,856	1,854	45 8 0	1 2 5	2.53

The crop of the first field is probably over-estimated at 18 annas.

The mixed crop (Exp. No. 81) of safflower and gram yielded fairly well. The safflower did not ripen for a month after the gram and the reaping of the crop was supervised by the Circle Inspector, Mr. Soman's camp being about 40 miles distant at the time. Gram is not grown alone in the district. It generally has subordinate rows of safflower. In the field of experiment every sixth row was mixed with safflower and gram. The field has black soil assessed at Re. 1-1-5 per acre. Tillage and season were both good; no manure was given. The field grows cotton, *jowári* and gram, the two latter mixed with minor crops. The yield of the tested crop is said to be the maximum for gram and 16 annas for safflower. It amounts to 543 lbs. gram and 123 lbs. safflower per acre together worth, with by-products, Rs. 16-14-4. The incidence of assessment is 6.44 per cent.

Mr. J. L. Lushington, Superintendent, L. R. and Agriculture, S. D.,

Submits three tests, one on wheat, one on gram and one on *tur*. None of the crops are single unmixed crops.

The wheat (Exp. No. 82) was grown on a black soil, *yeri bhumi*, field assessed at Rs. 2-9-0 per acre, and growing *jowári* one year followed by dry crop wheat or cotton the next. The season is called "very moderate, rain short." The cultivation "not very good but not quite indifferent." Five carts of village sweepings and cow-dung were applied per acre just before ploughing. The field was ploughed and cross-ploughed in May. Mr. Lushington says it is not usual to manure wheat in this district. The field was harrowed twice in September and once again four days before sowing. Forty-two pounds wheat were sown with a four-coulter drill about 15th October. Safflower with wheat occupied every eighth row. The safflower seed was sown through a separate tube (*yelsaddi*) attached by a rope to the seed drill and guided along the track made by one of the coulters of the seed drill, the amount of safflower seed being one-fourth of the wheat. The crop is said to be an eight-anna one for the field and the field a twelve-anna one as compared with other fields. The black soil was rather stiff, having a rather large admixture of clay. Mr. Lushington calculates that out of his test area $7\frac{1}{2}$ gunthas were under wheat and $\frac{1}{2}$ under safflower, and his calculations are based on the area cut being $7\frac{1}{2}$ gunthas. I do not think this is satisfactory and have taken 8 gunthas and bear in mind the fact that safflower was subordinate.

Outturn, &c., per acre was :—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		Principal Product.	By-Product.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
Experiment No. 82 ...	8	489	537 straw. 310 chaff.	16 8 5	2 9 0	15.50

The gram experimented on (No. 83) was grown on a field of brown soil, *hulkeri masári*, with a stony surface. The experimenter in his notes says: "The field itself is a twelve-anna field and the crop is estimated at four annas, the *annevári* of the village for gram being six annas." In the statement the anna valuation is given as eight annas and this appears to be the correct valuation for the field. Safflower is said to occupy $\frac{1}{10}$ th of the space growing gram. Before ploughing the land was lightly dressed with two to three cart-loads of cow-dung and sweepings. Ploughing began in April. The land was twice ploughed and twice cross-ploughed at intervals of 15 days each. In July it was harrowed once and again four times at intervals of a week in September-October. The seed, 31 lbs. per acre, was sown in the middle of October with a four-coultered drill. Safflower was sown by the following tube (*yelsaddi*) and in the proportion of 3 : 16 to the gram. The crop was poor owing to deficient rainfall. The tillage operations, especially the ploughing in the hot weather, must have been costly. The gross value of the outturn would certainly not meet expenses. The field grew Italian millet and kharif *jowári* in the two previous years.

Outturn, &c., results are as under :—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		Principal Product.	By-Product.			
	As.	Lbs.		Rs. a. p.	Rs. a. p.	
Experiment No. 83 ...	8	172	Not weighed.	6 11 5	0 9 3	8.61

Mr. Lushington calculates the by-product as worth five annas per acre, but says it is nominal and does not give the quantity.

Mr. Lushington's last experiment (No. 84) was taken on *tur*. He says: "The object of the experiment is to show what extra outturn plus his *jowári* and minor pulses the eighth *tur* row gives to a *rayat* with a field rated in these districts at about Rs. 2-10-0 per acre, as generally experiments are taken with the *jowari*, &c., alone without this *tur* row being taken into consideration."

The main crop of the field was *jowári* and it was sown with a four-coultered drill. Every eighth row is *tur*. Mr. Lushington cut 64 gunthas in order that the minimum of 8 gunthas under the crop should be got. With the *tur* was sown *pundi* (hemp), the seed-rate of the *pundi* being one-tenth that of the *tur*.

The soil is black *yeri bhumi*. The field is said to be a twelve-anna field, and the *tur* a sixteen-anna crop for the field. The land was ploughed in May twice up and down and twice across, and was harrowed the same just before sowing. Manure at the rate of $3\frac{1}{4}$ cart-loads per acre was put on after the first ploughing. Seed was sown in July at the rate of $7\frac{2}{3}$ lbs. per acre, which is a very high rate I think.

Outturn, &c., per acre :—

	Anna-Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		Principal Product.	By-Product.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
Experiment No. 84 ...	16	82	175	3 6 0	2 10 0	77.7

Owing to the nature of the experiment the figure for incidence of assessment obtained is of no value. It is necessary to remember also that *pundi* was not tested.

To get the true incidence of assessment the Rs. 3-6-0 should be added to the acre value of the *jowári* and other minor crops. Mr. Lushington remarks: "The rayats say *tur* flowers seven times; the consequence is that at the time of cutting many pods are not thoroughly ripe or properly developed. The cutting of this particular *tur* took place on January 20th. All the *tur* fields were being cut at the time." It is true that *tur* continues to produce flowers for several months, and when the crop is ready, flowers and ripe fruit may be found on the same plant. The pods which ripen earliest may burst if harvest is delayed too long. If the crop is really good it is left until the leaves begin to drop and litter the ground. Even at this stage flowers will be found on the younger shoots or branches. If the crop is poor it is generally cut much earlier.

Bijapur.

Mr. Pánse, Acting Collector, asked his Assistant to do 14 and his Deputy to do 16 experiments. This appears to have been found rather too much, and the Assistant Collector was asked to do four altogether on *jowári*, *bájri*, wheat and gram; and the Deputy Collector also four on *jowári*, linseed, wheat and cotton. Mr. Pánse on reversion to the Assistant Collector's office did one experiment on *jowári* and two on cotton. Mr. Page did 3 on *jowári*, linseed and wheat, and Mr. Artál, District Deputy Collector, five, one each on *bájri*, wheat, linseed, gram and late *jowári*.

Mr. G. D. Pánse, Assistant Collector,

Reported three experiments, one on *jowári* and two on cotton. The experimenter has sent about fifty pages of notes forming a most interesting essay on Bijapur generally. A good deal of it however is repetition. Mr. Pánse appears to have a set form of remarks. He has taken considerable care in finding out what the expenses of cultivation are and what amount of actual profit the cultivator gets. It appears that Bijapur cultivators are lazy and ignorant and involved in debt. On the other hand the land is good and cultivation yields immense profits.

Mr. Pánse thinks the Tagái system is doing good because it teaches the people what an absurdly high interest their Sávkárs charge. He is surprised at the conservatism of the Bijápur rayats.

Dry-crop cultivation is described by the experimenter. Lands are manured or rather slightly dressed with manure once in three years. They are ploughed with a heavy ten-bullock plough once in ten or twelve years. The small plough is used every year. After ploughing the land is harrowed with a two-bullock harrow, and seed is drilled. The land is weeded once or twice with a bullock hoe and sometimes by hand.

The first experiment (No. 85) is on *jowári*. The whole field measures 23 acres 18 gunthas and is assessed at Rs. 16. The soil is black *yeri-bhumi*. The crop was exceptionally good and showed signs of most careful cultivation. The anna-estimate of the crop 16 is, I imagine, too low. The season was favourable. Outturn was 1,469 lbs. grain, 964 lbs. chaff, and 13,790 lbs. *kadbi* per acre, which is far and away above what can generally be expected. There was also *tur* untested; every eighth row was *tur*. Manure was applied; Mr. Pánse says 88 cart-loads of cow-dung and rubbish at 4 annas the cart-load for the whole field.

The entire field gives an outturn of 34,438 lbs. *jowári*, 22,261 lbs. chaff, and 3,283 maunds *kadbi*, valued at Rs. 671-9-8, Rs. 98-6-6 and Rs. 205-3-0, or in all Rs. 975-3-2. Average value per acre comes to Rs. 41-9-4, and incidence of assessment to 1·64 per cent. Mr. Pánse gives the following details of cultivation expenses for the whole field:—

Operation.	Bullocks.	Days.	Wages.	Cost.	Men.	Days.	Wages.	Cost.	Total.
			Rs. a. p.	Rs. a. p.			Rs. a. p.	Rs. a. p.	Rs. a. p.
Ploughing	8	12	0 2 4	7 0 0	4	12	0 3 0	9 0 0	16 0 0
Manuring			88 cart-	loads at 4 p	per rupee.				22 0 0
Harrowing	4	6	0 2 4	1 12 0	2	6	0 3 0	2 4 0	4 0 0
Sowing	4	6	0 2 4	1 12 0	3	6	0 3 0	3 6 0	5 2 0
Seed			46 sers, 72	tolas, at 20	ers per	rupee.			2 5 6
Weeding	4	5	0 2 4	1 7 4	4	5	0 3 0	3 12 0	5 3 4
Removing grass			79	women at	1 anna.				4 15 0
Reaping					12	3	0 3 0	6 12 0	6 12 0
Thrashing	16	2	0 2 0	2 0 0	5	2	0 3 0	1 14 0	3 14 0
Cart hire			3 carts for	2 days at 8	annas	per day.			3 0 0
Balutas... ..									37 11 8
Watchmen			2 at Rs. 6	per month	for 4	months.			48 0 0
Assessment									16 0 0
Local cess									1 0 0
Total expenditure ...									175 15 6

Total profit on the holding Rs. 799-3-8. Two bullocks and a man is called a *galle* and the charge per *galle* is 5 annas 4 pies. This is an extremely cheap rate. *Baluta* is what is paid to the village servants. It is not fair to charge it all against the land, as a good deal of it, in fact most, is remuneration for private service. There are 8 *Balutadárs* and they get, according to Mr. Pánse, about $\frac{1}{24}$ th of the total produce between them. The expenditure on watchmen seems to me excessive. It is not clear why the field should require watching for four months.

Mr. Pánse's two cotton experiments are not satisfactory; only one picking was taken from each field. Usually the cotton of the district is picked twice. Mr. Pánse says the yield of the second picking may vary from $\frac{1}{8}$ to $\frac{1}{2}$ of the first picking according to the character of the season. I cannot enter the results of these experiments in the tabulated statement of results. The season was not favourable and the yield is estimated at 13 annas in both cases. The cultivation in both fields was indifferent. Neither field was manured last year; both get manure every third year. In both fields the seed-rate is $12\frac{1}{2}$ lbs. per acre. The two experiments were done on the same day in the same village. The cotton is valued at rather over 17 lbs. per rupee, which is a cheap rate. The yield of the first experiment comes to 155 lbs. and of the second 225 lbs., valued at Rs. 8-14-2 and Rs. 12-14-6 respectively.

Mr. Pánse calculates the expenditure, including assessment and local cess on the fields, to be respectively Rs. 2-12-7 and Rs. 2-6-6 per acre. The calculations

are based on exceptionally low rates for bullock and manual labour. The profit per acre comes to Rs. 6-1-7 and Rs. 10-8-0. Incidence of assessment comes to 13.42 and 7.99 per cent. respectively.

Mr. H. Page, Assistant Collector,

Submits three experiments, one on late *jowári*, one on linseed and one on wheat.

The wheat and linseed (Exp. Nos. 86 and 87) were on the same field and were tested on the same day. There were subordinate rows of safflower in both the wheat and linseed. Mr. Page should have disregarded the safflower, if he could not test it. He estimates that in the wheat part one guntha in nine was under safflower and in the linseed part $1\frac{1}{3}$ in $9\frac{1}{3}$, and assumes in calculating acre averages that wheat and linseed actually growing on 9 and $9\frac{1}{3}$ gunthas respectively really only occupied each 8 gunthas. I have made the necessary corrections. The field measures 25 acres 2 gunthas and is assessed at Rs. 25 or just under Re. 1 per acre. The season was fair for wheat and good for linseed; cultivation is described as good. No manure was applied to the part of the field under wheat but 25 cart-loads to 4 acres under linseed.

The field has black soil and grows a variety of dry crops—*jowári*, wheat, safflower, gram, linseed, cotton, hemp and sesamum. Seed-rates are given as $18\frac{3}{4}$ lbs. wheat and $5\frac{1}{2}$ lbs. linseed, in each case less than half what is ordinarily required. Wheat was sown with a four-coultered drill in the middle of October and linseed with a three-coultered one at the end of September. Mr. Page says that every eighth row of wheat and every sixth row of linseed were “followed by a row of safflower.” As a four-coulter drill was used in the one case and a three-coulter drill in the other, I take this to mean that safflower was sown mixed with the wheat in every eighth row and with the linseed in every sixth row, the safflower being sown with a following tube (*yelsaddi*).

The outturn figures are :—

			OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
			Principal Product.	By- Product.			
			Lbs.	Lbs.			
Experiment No. 86	...		276	209	Rs. a. p. 8 5 11	Rs. a. p. 0 15 11	11.88
Do. No. 87	...		294	...	12 9 7	0 15 11	7.89

The third test (No. 88) was on rabi *jowári* growing on black soil assessed at Re. 1-1-3 per acre. Seed-rate 8 lbs. per acre; no manure for the last twelve years; season fair; cultivation good. The field grows cotton, linseed, safflower, *jowári*, &c.

Outturn, &c., results are :—

			OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
			Principal Product.	By- Product.			
			Lbs.	Lbs.			
Experiment No. 88	...		362	1,090	Rs. a. p. 8 12 7	Rs. a. p. 1 1 3	12.27

Mr. R. C. Artál, District Deputy Collector,

Submits five tests, one each on *bājri*, wheat, gram, linseed and late *jowári*. The sample *ser* of *bājri* was $4\frac{1}{2}$ *tolas* and of wheat 2 *tolas* short of the recorded weights. Except these points the experiments are quite satisfactory and the remarks full and clear. The care with which the experiments have been made gives confidence in the trustworthiness of Mr. Artál's weighments and the differences in weights may be safely put down to some mistake in packing or loss in transit. I cannot help remarking that Mr. Artál appears to have a set form for his remarks, as they are for pages the same word for word in all his experiments. In all the experiments the fields had rows of subordinate crops and Mr. Artál has deducted 2 out of 12 gunthas for them in the first two and $1\frac{1}{4}$ out of $11\frac{1}{4}$ in the last three. As these deductions can only be approximate, it is better to consider the area cut as 12 or $11\frac{1}{4}$ and not 10 gunthas, and bear in mind the fact that there are subordinate crops. The calculation figures have been changed accordingly.

The *bājri* field (Exp. No. 89) measured 11 acres 35 gunthas plus 2 gunthas *Kharáb*, and is assessed at Rs. 8 or Re. 0-10-9 per acre. The soil is said to be a sandy loam. No manure was applied. The cultivator stated that the field had been manured four or five years ago, but could not give the amount. Anyway its effect would hardly be felt now. Seed-rate was just under 3 lbs. per acre, which is rather low. The seed was drilled with a three-coulter drill early in August. Mr. Artál remarks that the lateness of the sowing was due to the failure of the early rains. The rotation of crops is undefined and the field appears to grow all sorts of crops, *bājri*, sesamum, *mug*, hemp, *kulthi*, *jowári*, onions, chillies, tobacco, *tur*, *alsandi*, gram and black gram. This year the *bājri* had a subordinate crop of *kulthi*, this pulse being sown with the *bājri* in every sixth row.

Before sowing the land was thrice ploughed and hoed once with four bullocks and twice with two. After drilling the seed was covered by a light hoe and twenty days afterwards a hoe was worked between the rows. There was no hand weeding. The crop is estimated at 14 annas. The acre outturn was 619 lbs. grain and 2,183 lbs. by-products valued at Rs. 9-10-1. Incidence of assessment is 6.97 per cent. *Bājri* grain has been valued at 67 lbs. per rupee and the by-products at about 47 cwts. Both these rates are extremely low. Mr. Artál priced *bājri* at 51 lbs. and by-product at 8 cwts. last year in the same district.

The second test (No. 90) was on unirrigated wheat. The land is light black soil and is assessed at Re. 1-0-10 per acre. The seed, 31 lbs. per acre, which is low, was drilled in the last half of October. The field is never manured. It was ploughed and harrowed. After sowing it was neither hand-weeded nor bullock-hoed. The yield was adversely affected by the shortness of the rainfall, and the anna valuation is 10 to 12. The yield per acre was 379 lbs. grain and 450 lbs. by-product. The grain has been valued at 11 *ser*s or $42\frac{3}{4}$ lbs. per rupee, and the by-products at $9\frac{2}{5}$ cwts. This again is, I think, much too low, at any rate for the grain. Mr. Artál made three experiments on wheat in 1893 at the same village and the prices he then quoted were $29\frac{2}{3}$ lbs. grain and $10\frac{7}{8}$ cwts. by-products. Incidence of assessment works out to 11.33 per cent. The field is cultivated by a tenant who pays the assessment and gives half the produce to the landlord.

Mr. Artál's third experiment (No. 91) was on gram grown on a field of light black soil, *kárlu*, assessed at the rate of Re. 0-15-4 per acre. The rotation is undefined, but the field has grown in the past three years late *jowári* and linseed alternately with wheat and safflower. The season was favourable. The field is never manured. The cultivation is described as good. Mr. Artál estimates the outturn at from 13 to 15 annas. As the season and cultivation were both good, it is not understood why the anna valuation should be below 16. The field was twice ploughed with a light plough and about 39 lbs. of seed were drilled in October with a four-coultered drill. There was no hand-weeding. The outturn was 597 lbs. pulse per acre valued at Rs. 15-10-0. In every eighth row safflower was sown and its yield is not taken into consideration for reasons given above. It should however be borne in mind. Incidence works out to 6.13 per cent.

Linseed was tested on the same day as gram and at the same village. The soil is black soil, *yeri bhumi*, assessed at Re. 0-15-3 per acre. The season was fair. The field is never manured. Safflower was sown in every eighth row, and I have considered the test area as above, also in the next experiment, $11\frac{1}{4}$ and not 10 gunthas. The cultivation is good; the rotation undefined, but wheat with safflower was grown alternately with cotton during the past three years. About $6\frac{1}{3}$ lbs. seed were drilled with the four-coultered drill in October. Outturn was 190 lbs. seed, valued at Rs. 8-13-2. Incidence of assessment comes to 10.95 per cent. Linseed is valued at 22 lbs. per rupee. The yield, which is poor, is estimated as a twelve to fourteen-anna crop.

Mr. Artál's last experiment (No. 93) done at the same village and the day after the gram and linseed tests is on late *jowári*, linseed (untested) being subordinate. The soil is black assessed at Re. 1-0-4 per acre. Season and cultivation are described as good. Manure is never applied. Seed-rate is $3\frac{1}{2}$ lbs. per acre drilled with a four-coultered drill in the latter half of September. The crop is said to have been a fair average one for the season, but Mr. Artál only estimates it at ten to twelve annas. The field grows *jowári*, linseed, hemp, wheat, safflower, gram, tobacco, &c. Outturn of grain was 389 lbs. and of straw 1,405 lbs. valued at Rs. 8-14-11. Incidence of assessment comes to 11.42 per cent. *Jowari* is priced at 16 sers or $56\frac{1}{2}$ lbs. per rupee. *Kadbi* is sold by what is known in this district as the *kát*—as much as $4\frac{1}{2}$ *háths* of rope will go round. The price of a *kát* is eight annas.

As there was a good deal of dry-crop experimenting done in Bijápur, it will be useful to show the results together here:—

Crop.	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.	Remarks.
		Principal Product.	By-Product.				
Jowári ...	As. 16	Lbs. 1,469	Lbs. 964 chaff. 13,790 kadbi.	Rs. a. p. 41 9 4	Rs. a. p. 0 10 11	1.64	Tur subordinate not tested.
Do. ...	8	362	1,090	8 12 7	1 1 3	12.27	
Do. ...	10 to 12	389	1,405	8 14 11	1 0 4	11.42	Linseed subordinate not tested.
Bájrí ...	14	619	2,183	9 10 1	0 10 9	6.97	Kulthi subordinate not tested.
Gram ...	13 to 15	597	437	15 10 0	0 15 4	6.13	Safflower subordinate not tested.
Linseed ...	12 to 14	190	341	8 13 2	0 15 3	10.95	Do.
Do. ...	12	294	...	12 9 7	0 15 11	7.89	Do.
Wheat ...	8	276	209	8 5 11	0 15 11	11.88	Do.
Do. ...	10 to 12	379	450	9 4 6	1 0 10	11.33	Do.
Average for dry crops...	...	...	...	13 11 9	0 14 11	6.78	

Dha'rwa'r.

Experiments on *ragi*, *jowári*, gram, wheat and linseed were ordered from this district. Mr. Lucas omitted to experiment owing apparently to his illness. Mr. Anderson did three experiments, one each on linseed, *jowári* and wheat. Mr. Bhángáonkar could not find in his charge a field growing linseed without any mixture and so gave that part of the programme up and tested gram and wheat.

Mr. F. G. H. Anderson, Assistant Collector,

Reports three experiments, one each on *jowári*, wheat and linseed. The test area in the first and third tests was only 5 gunthas in each case and therefore below the prescribed minimum. Mr. Anderson explains that the *jowári* crop was so heavy that it was difficult to effectively superintend an experiment over a

larger area. A *jowári* test does not require much time or trouble, however heavy the crop may be, and the explanation cannot be called satisfactory particularly in regard to the linseed, which generally has less bulk than any other crop. The *jowári* (Exp. No. 94) grew on a brown-black soil field. The soil is not of the first quality, the fault being the red admixture which gives the brownish colour. The field grows cotton, *jowári*, wheat, &c., and is assessed at Re. 0-13-2 per acre. It was manured with five cart-loads per acre cattle-dung and refuse. The season was exceptionally favourable. The rainfall was excessive for pure black soil but was just right for the field of experiment, the soil on account of the red admixture being apparently less dense than pure black and therefore more absorptive of heavy rain. The cultivation is described as ordinary good. Eleven pounds seed per acre drilled about the end of June produced a crop which ripened at the beginning of December. Mr. Anderson says the crop was "a full crop above the year's average and was taken as a sample of what the rayat regards as his highest reasonable expectation on favourable land and with good season." The by-product was weighed on rough country scales, Mr. Anderson says the weight is approximately correct.

The outturn, &c., results are as under :—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		Principal Product.	By-Product.			
		Lbs.	Lbs.			
Experiment No. 94	20	1,393	4,000	Rs. 25 4 0	Rs. 0 13 2	3.25

Both grain and by-product are valued at a cheap rate.

The wheat field (Exp. No. 95) selected for experiment has black soil of medium quality. It grows cotton, *jowári*, Italian millet, &c. One year kharif crops are grown, the next year rabi crops. The season was not altogether favourable. Sudden heavy falls of rain after the crop was sown did some harm, and apparently the soil did not hold sufficient moisture to mature the crop properly, as "it dried rather too soon." The crop is average for the season. The cultivators delayed sowing too long, expecting late October rains, which however did not come. There were subordinate rows of safflower with the wheat. The experimenter took $8\frac{1}{2}$ gunthas as test area, of which he considered $\frac{1}{2}$ guntha was occupied by safflower. It is better to consider the whole test area as occupied by wheat, and bear in mind that there was a subordinate crop which was not tested. The by-product was not weighed and is said to be unsaleable and of nominal value.

The outturn, &c., results for the wheat were as under :—

	Anna Estimate.	Outturn of Grain per Acre.	Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		Lbs.	Rs. a. p.	Rs. a. p.	
Experiment No. 95	11 to 14	391	16 10 7	1 10 11	10.09

The linseed (Exp. No. 96) tested by this officer was a second crop after rice on second order rice land. The second crop is taken every year if the soil is moist enough after the rice is reaped. Gram, *vál* or linseed are the usual second crops. The season was only fair. There was not enough late rain for a good linseed crop. The rice was manured but not the linseed. The crop was grown at very little cost. The field was once ploughed and the seed sown in the furrow behind the plough and covered by the soil moved in making the next furrow. Twelve pounds per acre of seed sown in December produced a crop which ripened in March. The yield is 244 lbs. worth Rs. 11 per acre. This is classed as a twelve-anna outturn. The incidence is 23.39 per cent., which is moderate considering that rice bears most of the assessment.

Mr. K. N. Bhángáonkar, District Deputy Collector,

Submits two experiments, one on wheat and one on gram. He says that unmixed linseed was not to be found, and his last year's experiment performed on mixed linseed was rejected, and he therefore could not do one on that crop this year.

The wheat was grown on rich black soil, *yeri bhumi*. It was manured at the rate of $2\frac{1}{4}$ cart-loads of manure per acre. The cultivation is described as good but Mr. Bhángáonkar does not enter into particulars. The field grows ordinary dry crops such as *jowári*, cotton and unirrigated wheat. This year the wheat had subordinate to it safflower, the experimenter says, one row of safflower to six of wheat. The seed was sown with a three-coultered drill in the middle of October. I fail to see how six rows of wheat to one of safflower could be sown with a three-coultered drill. There may have been 5 rows of wheat and 1 of safflower, but it is more probable that every sixth row was mixed safflower and wheat. The crop ripened in the middle of January.

Outturn, &c., per acre:—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		Principal Product.	By-Product.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
Experiment No. 97 ...	12	381	426	13 11 9	1 0 2	7.35

The experimenter himself calculated on a cut area of 12 gunthas, allowing 2 gunthas for safflower. As usual, I consider this unsatisfactory and prefer to bear in mind the fact of the subordinate crop's existence and calculate on the area of 14 gunthas.

This officer also tested gram (No. 98). The same remarks about the area tested apply. Safflower was again subordinate in the same proportion as with the wheat. The soil is black soil "not of the richest." The field grows all sorts of dry crops, green gram, *jowári*, cotton both indigenous and exotic, pigeon pea, large-fruited dolichos, niger-seed, sesamum, hemp, Italian millet, safflower, gram, linseed, cucumber, &c. This year the season was not very good for gram, the rainfall being deficient. No manure was used. Cultivation was good but details are not given.

Outturn, &c., per acre:—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		Principal Product.	By-Product.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
Experiment No. 98 ...	8	162	58 chaff. 23 stalks.	5 6 5	1 0 3	18.80

Kola'ba.

Sample *sees* of three tests made by Mr. Brooke were received in this office in December last. But report concerning these has not yet been forwarded. Messrs. Kánga and Thakár did between them the work allotted to the District Deputy Collector.

Messrs. Hearn, Wilkins and McIver of the Konkan Revenue Survey have altogether submitted four tests on rice from this district.

Mr. R. E. Kánga, District Deputy Collector,

Submits an experiment on rice (No. 99) which was carefully made. The soil was black soil and the field always grows rice followed by a second crop of *vál*. The *vál* has not been tested and the incidence of assessment is taken on the single crop. Even thus it is low enough—12·95 per cent. The seed sown was at the rate of 117 lbs. on $6\frac{2}{7}$ gunthas of seed-bed per acre. The rate seems rather large and the experimenter says that the seed was considered to have been thickly sown. Ráb was burnt on the 6 gunthas of seed-bed, 40 loads of cow-dung and 4 loads of rice straw. The Collector remarks: "It appears that with cow-dung and rice straw for ráb, i.e., without any *tahal* (tree loppings) or fine grass, a good field in a fairly good season with good cultivation produces a 14-anna crop or $\frac{2}{3}$ of a good average crop, and a return of 26 times the seed sown. It is fair to presume that with a good season the return would have been thirty-fold; and the experiment confirms the result of former experiments, showing that where cow-dung is obtainable in reasonable quantity, *tahal* is not a necessity."

The local estimate 14 annas appears to have been ascertained with care. Yet the yield is more than maximum according to the formulæ. This is only another proof that the formulæ want revision. The season was, on the whole, good. Late in the year a heavy fall of rain saved the rice crop. The land is assessed at the rate of Rs. 7-10-3 per acre. The outturn of rice was 3,045 lbs., and of straw 2,462 lbs., per acre. The latter seems rather low. The rice is priced at 57 lbs. per rupee, and the straw at 450 lbs. or 150 bundles per rupee. Incidence on the single crop comes to 12·95 per cent.

Mr. G. P. Thakár, District Deputy Collector,

Sends two experiments on gram. The reports are carefully made and quite satisfactory.

The first field (Exp. No. 100) was at Vinchavli in the Mángáon taluka. The soil was deep black, locally known as a Malkhandi Rabi. The field grows gram every year. The season was good and so was the cultivation. The later rains were very favourable for rabi crops. The moisture retained by the soil lasted longer than usual and was useful in nourishing the crop until it was quite ripe. Of the cultivation Mr. Thakár says: "The cultivator seems to be very careful. Small dams were put up by him on all sides of the plot so as to prevent the manure and water escaping from it. The plot was carefully weeded and twice ploughed. Some care is also required in sowing. The end of the drill must enter the ground to a certain depth. If it remains above that, the seed would fall in the upper dry layer, which would prevent it from germinating. If the seed is placed too deep in the soil, the pressure of the earth over it might spoil it. All the necessary precautions were taken, and the cultivation may be called very good."

The field was lightly dressed with manure in May, one and a half cart-load being put on. Seed was sown with a single drill in November—79 lbs. per acre being sown. This is a very high seed-rate. Mr. Thakár thinks a large amount of seed is required in the Konkan because the soil is inferior and the individual plants do not grow very large.

The field of the second experiment (No. 101) has black soil, *galvat jamin*. It also grows gram continuously. It was not manured, and the cultivation is said to have been indifferent, if not bad. The field was not weeded properly nor were the dams, referred to in the above experiment, built. It was twice ploughed. Mr. Thakár says the ploughing seems to have been indifferent, though we are not told how this showed itself.

• Outturn, &c., per acre :—

		Anna Estimate.	Outturn of Pulse per Acre.	Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		As.	Lbs.	Rs. a. p.	Rs. a. p.	
Experiment No. 100	...	16	296	10 0 0	0 10 1	6·30
Do. No. 101	...	12	275	9 5 4	0 15 6	10·38

Mr. E. H. Hearn, Deputy Superintendent, Konkan Revenue Survey,

Sends an experiment (No. 102) on rice, *Mudga*. The test is not altogether satisfactory. Season and cultivation are described as good and the crop an 18-anna one. The land is assessed at Rs. 6-12-2 per acre and grows rice every year. Seed-rate and area of seed-bed were not obtainable. The seed-bed was rábed with cow-dung, branch wood and straw, but amounts are not given. The rest of the field was not manured. The outturn was 2,062 lbs. paddy and 2,300 lbs. straw with 150 lbs. chaff worth in all Rs. 36-4-2. Incidence of assessment works out to 18·64 per cent. Mr. Hearn says a *ser* is equal to 60 *tolas*. He calculates however on one of $61\frac{3}{4}$ *tolas* and his sample half *ser* weighed in this office $29\frac{1}{4}$ *tolas*. Rice is valued very cheap at $61\frac{1}{2}$ lbs. per rupee.

Mr. Hearn also sends a test on *tur*. He has calculated the outturn at the rate of 82 *tolas* per *ser*. The sample *ser* received gave only 78 *tolas*. Mr. Hearn was asked if he had any explanation and has merely replied that as a matter of fact 78 *tolas* went to the *ser*. I have therefore corrected his figures and given the outturn in lbs. at 78 *tolas* to the *ser*. In answer to a further reference Mr. Hearn says the 82 *tolas* was what he got by using a balance scale and he supposes that this balance must have been wrong. The experimenter gave no notes explaining his figures; so he was asked how he calculated the value of the by-product. He says the Pátíl gave one anna as the value of the by-product from 10 gunthas and he has therefore taken 4 annas as the value per acre. This gives the low rate of 10 cwts. per rupee. Pátíls are naturally inclined to value things lightly, and *tur* chaff and leaves are probably really worth more.

The field measures 20 acres plus 3 acres 14 gunthas *Pot Kharáb* and is assessed at annas 4 per acre. It is reddish soil at the top of a small hill. It grows *nágli* or *vari* one year followed by *tur* the next and then two or three years fallow. Cultivation and season were good. The experimenter says: "Ráb was burnt on the soil in the month of May. Cow-dung and grass." This must have been for some other crop, probably rice or *nágli*. No further manuring was given. The experimenter says: "The field is ploughed up and then the seed sown broadcast and then ploughed again." Outturn was 320 lbs. per acre valued, with by-product, at Rs. 10-4-0 giving an incidence of 2·44 per cent. Mr. Hearn says the cultivators do not understand the system of anna valuation and he does not give it. The crop corresponds to a 13-anna one; but as the experimenter, who knows the Konkan well, says the crop was a good one for the soil on which it was grown, I have put it down at 16 annas.

Mr. W. D. Wilkins, Assistant Superintendent, Konkan Revenue Survey,

Submits one experiment (No. 104) on rice, *Tavsdál Halva*. The experimenter admits that this was about the only crop left standing and he cannot tell whether it was an average one or not. The season is said to have been favourable and the villagers state that the crop was a 16-anna one. I cannot admit that the anna valuation is anything more than a guess, probably wrong, for the yield is very poor. Seed-rate is stated to be 29 lbs. sown in 2·86 gunthas of bed for one acre. Mr. Wilkins works out this result very carefully, but not only does the seed-rate itself appear low but the area of the seed-bed is too small. The field itself was unmanured but the seed-bed was rábed in the following way:—About 500 sheep were folded for 3 successive days on a piece of rice-land measuring about $3\frac{1}{2}$ gunthas in December 1894 and 16 head-loads of brushwood were spread thereon in January. Later in the year, two head-loads of straw were spread on the brushwood and two of fine grass on the straw and dry leaves on the grass. The whole was moistened with water, sprinkled with soft earth and burnt at the end of February. The plot thus prepared was afterwards ploughed to receive the seed, which was sown broadcast at the end of May.

The land bears an assessment of Rs. 5-3-5 per acre. The soil is a reddish brown soil growing rice only every year and no second crop. The yield of paddy came to 1,075 lbs. per acre and 950 lbs. straw (dried). The grain is valued at 54 lbs. per rupee and the straw at $2\frac{1}{2}$ cwts. Total value of yield comes to Rs. 23-3-0 and incidence to 22·49 per cent.

Mr. J. A. McIver, Assistant Superintendent, Konkan Revenue Survey,

Submits one experiment (No. 105) on rice, *Dicálya*. The *ser* is said to weigh 62 *tolas*, but the sample only weighed in this office $59\frac{1}{2}$ *tolas*, and it is

doubtful how much of this is due to dryage. Except for this, the experiment is clearly reported.

The soil is red gravelly soil assessed at the rate of Rs. 2-15-1 per acre. It grows rice every year; Panvel and Diválya rice alternately. The rice-bed measured $12\frac{1}{2}$ gunthas, and $2\frac{1}{2}$ gunthas of seed-bed were used for this area and rábed; amount of ráb materials not given. The rest of the field was unmanured. Seed-rate comes to $30\frac{1}{2}$ lbs. on 8 gunthas of seed-bed per acre.

Outturn results are:—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		Principal Product.	By-Product.			
	As.	Lbs.	Bundles.	Rs. a. p.	Rs. a. p.	
Experiment No. 105	15	1,602	592	37 6 9	2 15 1	7.86

Price of paddy 51 lbs. and straw 100 bundles per rupee. The straw rate is very high.

Ratna'giri.

Experiments on *rági*, *kodra* and sesamum were directed to be made in this district. Mr. Crump, the First Assistant, did no experiments owing to his transfer to the Judicial Department, and his successor did not arrive in time for the work. Mr. Chuckerbutty has submitted one test on *rági* and two on niger-seed, and Mr. Kelkar, the District Deputy Collector, one on *rági*, one on *kodra* and two on niger-seed.

Mr. A. W. G. Chuckerbutty, Assistant Collector,

Submits three tests, two on niger-seed and one on *rági*. Mr. Chuckerbutty calls the niger-seed *kála til* or sesamum; but from his remarks and from the samples received it is clear that the crop was niger-seed. Mr. Chuckerbutty's mistake appears to be due to the vernacular name in Ratnágiri being *kírala til*. All three experiments are laboriously worked out and I think satisfactory. They were all done in the same village and at the same time, 8th and 9th November. Sample *sers* received here all weighed slightly less than what the experimenter records. This is almost certainly due to dryage, as the experimenter weighed his grain two or three days after cutting. The difference is however slight. In all three experiments the land is *varkas* land of an average class, *bharad varkas*, sloping stony ground, for the Rájápur taluka. Mr. Chuckerbutty observes: "The village is situated on a creek, but as is usually the case in a hilly taluka, the cultivated *varkas* land forms the slope of hills of moderate elevation above the sea-level." In each case a few years of cropping are followed by an equal or greater number of years of fallow.

The outturn from the niger-seed is shown below:—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		Principal Product.	By-Product.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
Experiment No. 106 ...	12	196	208	11 5 3	0 5 11	3.26
Do. No. 107 ...	14	255	280	14 1 11	0 4 0	1.77

By-products are valued at $2\frac{1}{2}$ cwts. per rupee. They are of practically no use. Neither field was manured. In the case of the second field, Mr. Chuckerbutty has cut only 5 gunthas and says there were only $6\frac{1}{4}$ gunthas altogether under the crop. It is a pity to choose such small patches for obvious reasons, and no good reason is given for contravening the standing orders on the subject. The seed-rates are both high, particularly in the second experiment. True average seed-rates cannot be obtained where only a small area is planted.

This officer's experiment (No. 108) on *rági* and *vari* mixed was taken in the same survey number as his first test on niger-seed, but in a different Phálani number. Here again there was only a small plot of 6 gunthas, and Mr. Chuckerbutty cut the whole of it. The area is below that required by standing orders. The season is said to have been good both for this and the niger-seed. Mr. Chuckerbutty states that this plot of ground was fallow from 1891-92 to 1894-95, and that it will grow *harik* next year, *til*, presumably niger-seed, the year after, and *sáva* in 1898-99, when it will again be left fallow. It appears to be cropped for about 4 years and to lie fallow for the next 4 years or so. The *rági* grown is known as *Dhondga Nachni* and is a somewhat late ripening variety. Seed-rate comes to about $13\frac{1}{2}$ lbs. per acre sown on a rábed bed. The amount of ráb materials and area of seed-bed are not given. Mr. Chuckerbutty says the area and the exact quantity of seed are unknown. The seed was sown in the beginning of June and the seedlings were transplanted a month later. $1\frac{1}{2}$ maunds of dried fish were applied, a small quantity being put in each hole into which a seedling was put.

Outturn, &c., per acre :—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		Principal Product.	By-Product.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
Experiment No. 108 ...	12	747 Rági 83 Vari	692 27	21 5 1	0 5 10	1.71

Mr. Chuckerbutty states that the *vari* was not intentionally sown but a small quantity of *vari* seed had got mixed with the *náchni* "presumably on the threshing floor." This may be so, but *vari* is sown with *náchni* in Ratnágiri, and at any rate the transplanting of the two must have been intentional.

Mr. V. R. Kelkar, District Deputy Collector,

Submits four experiments, two on niger-seed and one each on *nágli* and *harik*. Mr. Kelkar prices *nágli* straw at 21 lbs. per anna in his notes and 42 lbs. in his calculations. On reference, the correct figure is said to be 42 lbs. *Nágli* straw is a coarse fodder. The experiments are all carefully done, and fully reported. Mr. Kelkar has taken as much pains as usual.

The *nágli* (Exp. No. 109) was grown on *bharad varkas* land assessed at Re. 0-6-2 per acre and the experimenter states that attempts are being made to turn it into Kharif. The tenure is *Ráyatvári*. The field measures in all 12 acres 4 gunthas, and this year the crops were as follows :—

Crop.	Area.
	A. g.
Rice ...	3 27½
Hemp ...	0 5
Nágli ...	0 21
Fallow ...	7 30½
Total ...	12 4

If the rainfall is sufficient, rice is sown in parts, if not *tág* (*san* hemp). Of the fallow portion 20 gunthas are *Pot Kharáb* and $1\frac{1}{2}$ gunthas are taken up for Musalman burial purposes. The rest is inferior and under grass. It is stated that the half acre under *nágli* always grows a crop and is never fallow; such crops as *nágli*, *harik*, *vari*, niger-seed and *udid* are taken. The *nágli* was grown on a seed-bed, $3\frac{3}{4}$ gunthas in area, rābed with 7 head-loads of grass and *kaval*. Sifted earth mixed with rice husks was spread on top and the whole burnt. After the first showers $3\frac{1}{2}$ sers *nágli* were sown broadcast and then ploughed in. Seedlings were transplanted about 10th July. Area of seed-bed comes to $7\frac{1}{7}$ gunthas per acre and seed $8\frac{1}{13}$ lbs. The field was ploughed and cross-ploughed early in June and again ploughed in July before transplantation. One man and four women did the work of transplanting. The man made holes with a pointed pole about 3 inches apart. One woman followed him and put pieces of dried fish in each hole. Three women followed her and planted one or two seedlings in each hole and filled it up with earth. One man watched the transplanted seedlings for 3 days, as jackals and crows would damage them for the sake of the fish. The field was not well weeded. Nearly 21 maunds of fish manure costing Rs. 6 were used.

Outturn, &c., per acre:—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		Principal Product.	By-Product.			
		Lbs.	Lbs.			
Experiment No. 109	14	1,433	2,110	41 4 0	0 6 2	0.93

Mr. Kelkar cut three different patches to make up his 8 gunthas.

The two experiments on niger-seed (Nos. 110 and 111) were done in Khoti villages. The cultivators pay one-third of the gross produce to the Khots. Both the experimenter and the Collector deplore the system. The Collector says that the experiments "show how necessary it is that the security of fixed rents be given to the occupancy tenants of the Khots. No improvements can be expected in their lands until this is done." Mr. Kelkar's experiments add to our knowledge of the cropping and capabilities of the *varkas* lands of the district. The first field belongs to two persons, one owning 3 acres 2 gunthas in which the plot selected for experiment was. Thirty-five gunthas are under niger-seed and 7 under *harik*, the rest presumably being grass with a few gunthas of *Pot Kharáb*. The other field has 6 gunthas *vari*, 7 *kulthi*, 34 niger-seed and 7 fallow. In both fields Mr. Kelkar cut 3 patches of niger-seed and he gives their outturns separately thus:—

FIRST FIELD.					SECOND FIELD.				
Grain.					Grain.				
Sers.					Sers.				
Tolas.					Tolas.				
3 gunthas	...	...	11 $\frac{3}{4}$	5	4 gunthas	...	...	13 $\frac{3}{4}$	...
3 do.	...	...	9 $\frac{1}{2}$	3	2 do.	...	...	5 $\frac{3}{4}$	2
2 do.	...	...	6	8	2 do.	...	...	6 $\frac{1}{4}$	7
27 $\frac{1}{4}$					25 $\frac{3}{4}$				
= 30 $\frac{1}{2}$ lbs.					= 28 $\frac{3}{8}$ lbs.				
16					9				

The difference in yield of the various patches is considerable.

Both fields undergo four years' cropping and are then fallow for four years. The cropping of the first field is given thus:—

			Part under Harik.	Part under Niger-seed.
1892-93	...	...	Fallow for the last four years.	
1893-94	...	...	Nágli	Nágli.
1894-95	...	...	Sarvat Bhát	Harik.
1895-96	...	...	Harik	Niger-seed.
1896-97	...	...	Niger-seed	Sarvat Bhát.
1897-98	...	...	Fallow for the next four years.	

The whole of the second field was under *Sarvat* rice in 1894-95 and *nágli* in 1893-94, and the owner, a Mhár, said he would most likely sow *Sarvat* rice in the whole field next year. The two fields are thus contrasted:—

		Anna Estimate.	Outturn of Seed per Acre.	Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		As.	Lbs.	Rs. a. p.	Rs. a. p.	
Experiment No. 110	...	10	150	6 13 0	0 4 1	3.74
Do. No. 111	...	10	141	6 7 0	0 3 8	3.56

The straw and chaff are useless and not priced. The seed is valued at 22 lbs. per rupee, which is a cheaper rate than that quoted by Mr. Chuckerbutty. The experimenter mentions that the crop was not weeded as the plant has tender stalks, and they are liable to be broken if the weeding is not very carefully done.

Mr. Kelkar's last experiment (No. 112) was on *harik* or *kodra* in a Khoti village where the tenant pays $\frac{1}{3}$ produce to the Khot. The whole of the Phálani number was sown with *harik*. Mr. Kelkar again cut three patches, and they again differed considerably in outturn. The field is cropped for 5 years and lies fallow for 3. Crops grown were, in order, *harik*, *vari*, niger-seed, *nágli* and *harik*. This year's crop is therefore the last of the series. The land is said to be well situated and almost level. It was cultivated with care though unmanured. Seed, at the rate of 25 lbs. per acre, was broad-casted in June. The seed-rate is high— $2\frac{1}{2}$ lbs. per acre; the anna estimate, 10, is low.

Outturn results are:—

			Outturn of Grain per Acre.	Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
			Lbs.	Rs. a. p.	Rs. a. p.	
Experiment No. 112	...	...	736	7 5 9	0 6 8	5.66

The grain is priced at 100 lbs. per rupee, the straw not at all. The experimenter states that the cultivator immediately burnt the chaff to prevent cattle eating it as it is deleterious to them, and makes the following observation:—

“The grain is washed with cow-dung to eliminate its bad qualities and then ground with an earthen mill for food. If any person eats it without that, he, it is said, is attacked with shivering and vomits blood. It is the food of the poor.”

Mr. Patvardhan in his Thána report makes similar statements.

Ka'nara.

Mr. Divátia did 2 tests on rice and Mr. McNeill 3 on the same crop. Mr. Divátia could not carry out the third experiment owing to his being engaged in other emergent work.

Mr. N. B. Divátia, Assistant Collector,

Submits a test on rice sown broad-cast in the Kárvár táluka. The field is of a sandy dark-brown soil measuring 34 gunthas, and assessed at Rs. 3-8-0 or Rs. 4-1-10 per acre. It grows rice every year. The variety of rice is known as *Ajga*, and it is priced at rather over 60½ lbs. per rupee. The straw fetches 6 annas per hundred bundles, or about 10½ cwt. per rupee. The field was manured with cow-dung composted with leaves, 20 basketsful per acre. Season was fair but rain failed for a month after 15th August. Seed-rate is quoted at 17 lbs. 23 *tolas* per acre. This must be wrong and the experimenter thinks so. The usual rate is stated to be 1½ Khandis or 175 lbs. per acre. The formulæ rate is 120 lbs. Mr. Divátia states that transplanted rice is not grown in the village of Bád in which the experiment was taken.

The outturn, &c., results are:—

	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
	Principal Product.	By-Product.			
	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
Experiment No. 113 ...	3,013	4,462	54 4 0	4 1 10	7.58

The crop, which appears to be an excellent one, is classed at 16 annas. The outturn is said to have been greater last year. The cultivator is a tenant who pays 9 Khandis of paddy per annum as rent for the 34 gunthas—about Rs. 17 per acre. Of the soil the experimenter says: "The first layer nearly one inch thick is of dark-brown soil and below that it is sandy. Everywhere the soil is of the same sort and the admixture of sand makes the variations."

This officer also sends another test on rice in the same táluka. This field grows rice every year and is irrigated, when rain fails, from a neighbouring tank which has been improved and enlarged by the Khátedár of the field at a cost said to be Rs. 800. The seed was not sown in a seed-bed first, but broad-casted direct in the field. Seed-rate is 93½ lbs. per acre. Two varieties of rice grow in the field, Sarti and Motalgo; 2 gunthas of each were cut. The season was fair, but rain held off for 6 weeks in September and October. The soil is a brownish clay and Mr. Divátia calls the cultivation indifferent, because he says insufficient weeding was done owing to scarcity of labourers. 120 baskets of manure per acre were applied.

Outturn, &c., results are:—

	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
	Principal Product.	By-Product.			
	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
Experiment No. 114 ...	441 Motalgo. 250 Sarti.	1,873	27 15 10	2 12 6	9.93

The yield appears very poor. Fodder is priced at 100 bundles for 8 annas or 3¾ cwt. per rupee. Motalgo paddy at 31 lbs. and Sarti at 28½ lbs. per rupee. These rates are almost incredibly high, but Mr. Divátia in answer to a reference replies that they were ascertained "after due enquiry." He admits they "appear a little high." The by-product, too, here rated as 3½ cwt. is much dearer

than in the first test, where it was $10\frac{1}{2}$ cwt. per rupee. Sarti rice supplies the seed for the late, *Vaingan*, rice crop. Mr. Divátia's remarks are almost unintelligible from the number of Kánarese words he uses. It is not, for instance, to be assumed that every one understands the meaning of such words as *Ut*, *Soppu* and *Kúmba*. If they are to be used, they should be explained.

Samples of grain for this last experiment weighed in this office about 2 *tolas* in excess of the recorded weight. This is quite the reverse of what is usual.

Mr. J. McNeill, Assistant Collector,

Sends three rice tests which are very carefully and fully reported.

The first experiment (No. 115) was taken on a portion of a number which at original settlement was classed partly as Rice land, partly as Pulan and partly as Jiráyat. The cultivator pays for the 3 acres of land now under rice Rs. 2-14-0 per acre, whilst the original Rice area 1 acre 23 gunthas was assessed at Rs. 4-12-2 per acre. The new Rice land cannot be distinguished from the old. Rice is grown every year, but no second crop is taken. The crop was grown from broad-casted seed sown in the third week of June. The seed is sown sometimes earlier, sometimes later, according to the rainfall. The soil must be worked into a sloppy condition before the seed is sown. The seed-rate, 135 lbs. per acre, is said to be much lower than for poorer and more sandy fields, which receive 50 to 60 per cent. more. The season was very good, but not so good as the previous year, which was excellent. The tillage was careful and the field was well manured with 24 cart-loads or 480 baskets to the acre of cow-dung composted with leaves, husks, ashes and miscellaneous rubbish. The field is very favourably situate. It receives the wash from forest-clad hills and the water carries to the field fine mould and decayed vegetable matter which no doubt acts as manure. The crop was ripe on the 25th October and yielded well, exceedingly well, for broad-casted rice.

Mr. McNeill's second experiment (No. 116), also on broad-casted rice, does not show such a satisfactory outturn. The cultivation is described as indifferent, but in what respects is not clear, as the field was ploughed once in December and five times in June at intervals of 2 to 3 days. In August the field was weeded by hand. The season was only fair owing to an untimely break followed by a heavy fall when the crop was about ripe. The heavy rain beat the grain out of the ears. The field has rich brown soil, assessed at Rs. 2-2-10 per acre. It grows rice every year. 250 baskets of manure were applied per acre. The manure consisted of a compost of dung, litter and leaves. Seed at the rate of $94\frac{1}{2}$ lbs. per acre was sown at the end of June. The crop was ripe at the middle of December.

The third experiment (No. 117) by this officer is on *Vaingan* or hot weather irrigated rice. The number is 5 acres 33 gunthas, of which 5 acres 17 gunthas is classed as Rice. Generally sugarcane is grown in a portion of this and *Vaingan* rice over the greater portion. A larger portion, the experimenter thinks, would probably be cropped with sugarcane, if more labour were available. Mr. McNeill says: "No rice is grown in the rains owing to excess of water, a fact probably ignored when the land was classed." If there is too much water for rice, it cannot be very good for sugarcane; probably the sugarcane is really only grown in the driest portion of the number. The field was manured with a compost of cow-dung and forest litter, 100 to 150 head-loads being applied per acre. The soil itself is very rich. The level of the field is being raised by annual deposit of silt and mould, washed down from forest uplands. The crop was weedy, otherwise the tillage was good. About 64 lbs. of seed per acre was broad-casted late in November. The crop ripened at end of March. The seed-rate is much lower than that reported for *Vaingan* rice in former years. Mr. McNeill describes the cultivation thus :—

"The field is ploughed six or eight times at intervals of four or five days, the first ploughing being given before the end of the monsoon. During the whole time the field is kept in a sloppy condition, when the manure is ploughed in, the surface is made even with a plank drawn by bullocks, once lengthwise and once

across. During the night the inlets from the water channel are closed and next day the seed is sown. During the next 7 or 8 days a little water may be allowed to flow over the field by day, but it is always stopped at night. When the seedlings are well up, *i.e.* in about 7 days, the field is flooded to a depth of 4 to 6 inches and the water is kept at this level until the heads of the plants have begun to fall over, *i.e.*, about 15 days before cutting."

The field is watered by a channel running by the side of the field. The channel leads from a dam about half a mile away on a small river. Same channel serves fields both higher up and lower down, all the fields being owned by the same person. This year the supply, owing to scant late rainfall, was slightly deficient.

The results of Mr. McNeill's tests are tabulated below :—

				OUTTURN PER ACRE.			Value of Outturn.	Assessment per Acre.	Percent- age Inci- dence of Assess- ment.	Remarks.
				Anna Estimate	Principal Product.	By- Product.				
				As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.		
Experiment No. 115	...	...	...	18	3,210	5,487	63 0 7	2 14 0	4.56	Broad-casted rice.
Do. No. 116	...	...	...	16	1,328	4,090	35 9 4	2 2 10	6.11	Do.
Do. No. 117	...	...	...	16	1,124	4,070 (wet).	30 3 2	5 5 2	17.62	Vaingan rice.

TABULAR SUMMARIES.

Summary of Crop Experiment Reports,

O. S.=Original Survey;

No.	District, Táluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formulae.	AVERAGE PER ACRE.						Area of Test.
					Seed.	Yield of		Total Value of Produce.	Assessment, excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.	
						Principal Product.	By-Product.				
1	2	3	4	5	6	7	8	9	10	11	12
	AHMADABAD.		Annas	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.	A. g.
	<i>Mr. L. Robertson,</i> <i>Assistant Collector.</i>										
1	Dholka (Dholka) ...	Rice (Sutarsál), 4th November 1895.	8 to 10	975 to 1,220	27	429 in husk.	2,200	13 10 5	2 10 6 R. S.	19.45	0 8
2	Do. (do.) ...	Do. do. ...	12	1,460	26	774 in husk.	3,250	23 11 9	4 3 9 R. S.	17.84	0 4
	<i>Mr. P. J. Mead,</i> <i>Assistant Collector.</i>										
3	Dholka (Dholka) ...	Sugarcane (Dhol Sherdi), 27th and 28th January 1896.	12	2,810	30,476 sets.	4,411 gol.	...	376 5 3	2 4 3 R. S.	0.60	0 8
	<i>Mr. Jethálál Varajbhái,</i> <i>District Deputy Collector.</i>										
4	Dhandhuka (Sodhi) .	Wheat (red Kátha), 11th February 1896.	8	450	51	138	164	4 11 6	1 12 6 R. S.	37.74	0 10
5	Do. (do.)...	Do. (white), 12th February 1896.	8	450	51	218	128	7 11 10	1 15 4 R. S.	25.30	0 10
6	Do. (do.)...	Do. (do.) 13th February 1896.	8	450	51	242	246	8 14 7	1 8 8 R. S.	17.29	0 10
	KAIRA .										
	<i>Mr. W. Doderet,</i> <i>Assistant Collector,</i>										
7	Nadiád (Kamla) ...	Cajanus indicus (Tuvér), 12th February 1896.	14	660	4½	549	130 bundles sticks, 390 chaff.	17 2 0	4 12 9 R. S.	28.01	0 8
8	Do. (Kakark had Pati).	Do. 14th February 1896.	16	750	4	772	1,040 sticks, 595 chaff.	23 8 6	6 5 11 R. S.	27.07	0 8
	<i>Mr. B. E. Modi,</i> <i>District Deputy Collector.</i>										
9	Mátar (Pipalia) ...	Spiked millet (Báiri), 29th September 1895.	14	850	10	608	400 bundles straw, 77 chaff.	22 12 3	4 12 5 R. S.	20.98	0 8

Northern Division, 1895-96.

R. S.=Revision Survey.

Equivalent in Tolas of local measure Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
	Principal Product.	By- Product.	
13	14	15	16
Tolas.	Lbs.	Cwts.	
40 weight.	36½	10½	<i>Experiment No. 1.</i> — <i>Sutarsál</i> rice on ordinary black soil, converted into rice land 5 years ago. The field manured with 7 cart-loads per acre of ordinary manure and irrigated twice from a tank by means of a <i>jheel</i> . Season bad owing to deficient late rains; tillage good. 6½ gunthas of seed-bed are stated to have furnished seedlings for an acre. Yield, compared to the formulæ, only 4 annas.
Do.	36½	11¼	<i>Experiment No. 2.</i> —Same crop on <i>kyári</i> land manured with 4 carts per acre of cow-dung. Crop irrigated from a tank and also from a well. Seedlings from 6½ gunthas covered an acre of plantation. Season, &c., as above. Outturn 6 annas according to the formulæ, though estimated at 12 annas.
Do.	11¼	...	<i>Experiment No. 3.</i> —Sugarcane; <i>Dholi Sherdi</i> , on <i>Jiráyat gorádu</i> soil manured with 43 cart-loads per acre and top-dressed with about 730 lbs. of castor-seed refuse. Crop watered from a well, but the extent of irrigation not ascertained. Rotation :—(1) and (2) <i>juvár</i> , (3) <i>bájrí</i> , (4) <i>tíl</i> , (5) <i>juvár</i> and <i>tíl</i> , (6) <i>tíl</i> and (7) sugarcane. Season and cultivation both fair. Seed-rate high. Yield 17 annas according to the formulæ. <i>Gol</i> priced very high.
Do.	32¼ 5	3	<i>Experiment No. 4.</i> —Dry-crop wheat, red <i>katha</i> , on unmanured and unirrigated black soil, which is occasionally enriched by deposits from flood-water. Rotation :—(1) wheat, (2) <i>juvár</i> , wheat and cotton, and (3) cotton. Incidence high owing to very poor outturn, which represents only a 2-anna crop of the formulæ. Season very unfavourable and cultivation indifferent.
Do.	29¾	2¾	<i>Experiment No. 5.</i> —White dry-crop wheat on similar soil, growing cotton alternately with <i>juvár</i> or wheat. Other remarks same as above.
Do.	29¾	3	<i>Experiment No. 6.</i> —Do. Do. Do.
Do.	38¾ 5	78 bundles sticks, 2¾ chaff.	<i>Experiment No. 7.</i> — <i>Tuver</i> , a subordinate crop in a mixture with <i>kodra</i> , on unmanured good dry-crop <i>gorádu</i> land, growing during the past three years <i>juvár</i> , <i>bájrí</i> and <i>básto</i> mixed with pulses. Season unfavourable owing to scanty late rains, but apparently <i>tuver</i> thrived at the expense of <i>kodra</i> the principal crop; cultivation good. Incidence on the subordinate crop alone.
Do.	38¾ 5	78 bundles sticks, 2¾ chaff.	<i>Experiment No. 8.</i> —Same crop on similar but more highly assessed land dressed with 3¼ cart-loads of cow-dung per acre. Rotation :— <i>Bájrí</i> , <i>kodra</i> or barley with pulses and also tobacco. Season and tillage as above. Incidence on the subordinate crop alone.
Do.	32¼ 5	107 bundles.	<i>Experiment No. 9.</i> — <i>Bájrí</i> mixed with <i>math</i> and <i>juvár</i> on <i>gorádu</i> soil lightly dressed with 6 cart-loads per acre of ordinary manure and growing (1) cotton and wheat, (2) sugarcane and (3) <i>bájrí</i> and wheat during the last three years. Season favourable and tillage good. The outturn, exclusive of the subordinate mixtures which were not tested, 10 annas of the formulæ standard.

Summary of Crop Experiment Reports,

O. S.—Original Survey;

No.	District, Táluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formulae.	AVERAGE PER ACRE.						Area of Test.
					Seed.	Yield of		Total Value of Produce.	Assessment, excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.	
						Principal Product.	By-Product.				
1	2	3	4	5	6	7	8	9	10	11	12
	KAIRA—continued.		Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.	A. g.
	<i>Mr. B. E. Modi, District Deputy Collector.</i>										
10	Mátar (Ratanpur) ...	Spiked millet (Bájrí), 12th October 1895.	10	610	11	174	185 bundles.	7 0 9	4 12 9 R. S.	68.07	0 8
	PANCH MAHA'LS.										
	<i>Mr. J. A. G. Wales, Assistant Collector.</i>										
11	Godhra (Godhra) ...	Do. 30th October 1895.	12	620	23	709	1,000 bundles straw, 228 chaff.	42 11 10	1 2 1 O. S.	2.65	0 10
12	Do. (Isrodiya) ...	Do. 6th November 1895.	8	410	51	199	364 bundles straw, 75 chaff.	13 4 4	0 13 4 O. S.	6.13	0 12
13	Do. (do.) ...	Do. 6th November 1895.	8	410	14½	464	632 bundles straw, 144 chaff.	27 14 9	1 6 8 O. S.	5.08	0 10
14	Do. (Rámpura) ...	Wheat (Popatia), 17th March 1896.	8	640	78	506	932 straw, 137 chaff.	17 7 2	1 13 5 O. S.	10.54	0 8
	<i>Mr. Jivanlál Prán-jivandás, District Deputy Collector.</i>										
15	Dohad (Dohad) ...	Rapeseed (Sarsav), 24th February 1896.	20	800	10	441 seed.	1,046	23 5 6	0 15 9 R. S.	4.21	0 10
16	Do. (do.) ...	Red gram (Lál Chana), 24th February 1896.	16	975	25	349	492	9 4 0	1 3 2 R. S.	12.95	0 10
17	Do. (Kharaj (small)).	Do. 25th February 1896.	15	915	51	359	428	9 6 4	1 3 9 R. S.	18.13	0 10
18	Do. (Nagrála) ...	Do. do.	11	670	48	333	256	8 8 3	1 9 11 R. S.	19.02	0 8

Northern Division, 1895-96—continued.

R. S.=Revision Survey.

Equivalent in Tolas of local measure Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
	Principal Product.	By- Product.	
13	14	15	16
Tolas.	Lbs.	Cwts.	
40 weight.	32½	107 bundles.	<i>Experiment No. 10.</i> —Same crop with the usual pulse mixtures grown continuously on similarly assessed land not manured for the past two years. Tillage good, but unseasonable rains delayed sowing, and the crop suffered owing to scant rainfall later. The outturn only 3 annas according to the formulæ.
Do.	30	100 bundles straw, $\frac{3}{14}$ chaff.	<i>Experiment No. 11.</i> — <i>Bājri</i> mixed with <i>twer</i> and <i>math</i> on <i>gorādu</i> land manured with 9 cart-loads per acre of cattle-dung and growing the same crops every year. Later rains deficient and test crop affected thereby; tillage good. Seed had to be sown a second time owing to the washing away of the first sown seed. By-products valued very high; hence figures in column 9 untrustworthy. Subordinate crops not tested in this and the following 2 tests.
Do.	30	100 bundles straw, $\frac{3}{14}$ chaff.	<i>Experiment No. 12.</i> —Same crop mixed with <i>math</i> and <i>mug</i> on similar soil manured with 6½ carts per acre of cattle-dung and growing <i>bājri</i> and <i>banti</i> with the pulses without any fixed rotation. Rain sufficient, but tillage indifferent. Seed-rate very high. Outturn very poor and represents, exclusive of the pulse mixtures, only a 4-anna crop of the formulæ.
Do.	30	100 bundles straw, $\frac{3}{14}$ chaff.	<i>Experiment No. 13.</i> —Same crop mixed with <i>math</i> , <i>brinjals</i> and chillies on similar land manured with 10½ loads of manure per acre. Rotation undefined, but the field grew during the last 3 years (1) <i>bávto</i> and sugarcane, (2) <i>bājri</i> and tobacco, and (3) <i>bājri</i> and <i>bávto</i> , the last two with the usual pulse mixtures. Season as above. Tillage good. Seed sown twice as in Exp. No. 11. Valuation doubtful for reasons given above.
Do.	29	...	<i>Experiment No. 14.</i> —Irrigated wheat, <i>Popatia</i> , as second crop on stony black soil growing rice followed by a second crop assisted by well water. The field liberally treated, before sowing of the first crop, with 27 carts of farmyard manure per acre. Rains deficient; cultivation good. By-product not valued. Incidence of assessment low for a second crop.
Do.	18½	19	<i>Experiment No. 15.</i> —Rapeseed as a second crop on light brown <i>gorādu</i> soil growing maize every year and occasionally rice followed by gram and rapeseed. 10 carts of cow-dung per acre used before sowing. Season and tillage both good. The outturn is perhaps overestimated at the maximum. Incidence on the second crop only.
Do.	41	6	<i>Experiment No. 16.</i> —Red gram on similar soil after maize which had received a light dressing of 8 carts of cow-dung per acre. The field grows maize every year followed by gram with or without rapeseed. Season below average and tillage indifferent. Seed-rate low.
Do.	41	6	<i>Experiment No. 17.</i> — Do. do. do. Gram follows maize every year. Seed-rate average.
Do.	Do.	Do.	<i>Experiment No. 18.</i> — Do. do. do.

Summary of Crop Experiment Reports.

O. S. = Original Survey;

No.	District, Taluka, Village, and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formula.	AVERAGE PER ACRE.						Area of Test.
					Seed.	Yield of		Total Value of Produce.	Assessment, excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.	
						Principal Product.	By-Product.				
1	2	3	4	5	6	7	8	9	10	11	12
	BROACH.		Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.	A. g.
19	Mr. Pherozshah Pestonji, District Deputy Collector. Ankleshvar (Kat-pore).	Rice (Sukhvel), 15th December 1895.	20	2,000	90	3,445 in husk.	4,700 bundles.	126 5 07	10 1 O. S.	6.04	0 8
20	Do. (Chorasi) ...	Do. (Jadu Salin), 3rd November 1895	10	940	55	1,670 in husk.	3,935	46 0 6	10 3 0 O. S.	13.88	0 8
21	Do. (do.) ...	Wheat (Hasia and Katha) with Dolichos lablab (Val) ...	10	610	60	410	490	27 4 9			
			6	...	8	105	110				0 8
22	Do. (Survadi) ...	Spiked millet (Bajri), 23rd November 1895.	18	1,400	5	1,205	3,010.	46 14 0	10 14 6 O. S.	23.26	0 8
23	Vagra (Vagra) ...	Sesamum (Tal), 5th February 1896.	8	260	1	150 seed.	...	11 13 0	4 10 2 O. S.	39.51	0 8
24	Mr. Sorabshah Hormasji, District Deputy Collector. Broach (Borbhattha) .	Rice (Dudhni), 13th October 1895.	4	280	75	246 in husk.	779	7 10 0	13 11 5 O. S.	179.84	0 8
25	Do. (do.)...	Spiked millet (Bajri), 13th October 1895.	20	1,600	104	1,350	2,195	51 4 8	13 12 2 O. S.	26.82	0 10
26	Jambusar (Limaj) ...	Sesamum (Tal) 26th January 1896.	8	300	1	131 seed.	...	11 0 0	5 5 10 O. S.	48.76	0 10

Northern Division, 1895-96—continued.

R. S. = Revision Survey.

Equivalent in Tolas of local measure Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
	Principal Product.	By- Product.	
13	14	15	16
Tolas.	Lbs.	Cwt.	
38 $\frac{1}{8}$ weight.	30	400 bundles.	<i>Experiment No. 19.</i> —Continuous rice, <i>Sukhvel</i> , on good black soil richly dressed with 60 cart-loads per acre of cattle droppings and irrigated once a week from a neighbouring tank. 2 $\frac{1}{2}$ gunthas of seed-bed, which was in the field itself and received no special treatment, sufficed for 19 gunthas of plantation. No second crop is ever grown. Season favourable and tillage excellent. Seed-rate rather high. Outturn nearly 1 $\frac{1}{2}$ times the formulæ maximum. Grain valued very high.
Do.	39	10 $\frac{5}{7}$	<i>Experiment No. 20.</i> —Coarse rice, <i>Jádu Sálu</i> , on similar but more highly assessed land which is watered by flood-water coming from high-lying lands in surrounding villages. The field manured with 19 cart-loads per acre of cattle droppings. Rice is followed by wheat if season favourable. Seed-bed, which was hired close to the village, was not manured. Tillage good, but season unfavourable and crop suffered for lack of moisture. Yield probably underestimated, being 17 annas according to formulæ.
Do.	{ 22 $\frac{1}{3}$ 39	{ 6 $\frac{6}{7}$ 6 $\frac{6}{7}$	Wheat mixed with <i>vál</i> as a second crop on the same land. Season as above; tillage indifferent. Outturn poor. Prices high.
Do.	27 $\frac{1}{7}$	10 $\frac{5}{7}$	<i>Experiment No. 22.</i> — <i>Bājri</i> on unmanured light yellow <i>gorat</i> soil commanded by a large well and growing usually garden crops and dry crops only occasionally to give rest to the land. Test crop watered once in September owing to deficient rainfall; tillage good. Outturn full average. Incidence somewhat high, but rich garden crops grown on part of the field.
Do.	13	...	<i>Experiment No. 23.</i> — <i>Tal</i> on unmanured good black soil growing the same crop or <i>juvār</i> alternately with cotton. Season more unfavourable than in the above tests and outturn only poor—4 annas according to the formulæ. Incidence high, but cotton will doubtless bear greater portion of the assessment.
40 weight.	46 $\frac{7}{8}$	2 $\frac{13}{14}$	<i>Experiment No. 24.</i> —Unmanured rice, <i>Dudhni</i> , on light <i>gorádu</i> alluvial soil growing rice followed by rabi crops of <i>juvār</i> or wheat in alternate years. Field manured in the previous year by folding sheep. Season very unfavourable owing to want of August and September rains; cultivation good. Outturn poor, being equal in value to only half the Government dues.
Do.	28 $\frac{1}{2}$	4 $\frac{3}{4}$	<i>Experiment No. 25.</i> — <i>Bājri</i> on similar soil liberally treated with 48 carts per acre of farmyard manure. Season and tillage as above, but crop apparently did not suffer much. Outturn, compared to the formulæ, 17 annas.
Do.	12	...	<i>Experiment No. 26.</i> — <i>Tal</i> on light <i>gorádu</i> soil grown in rotation with cotton. Field manured for the previous cotton with 15 cart-loads of farmyard manure. Seed-rate low. Season and cultivation as above. Yield only 3 annas according to formulæ standard.

Summary of Crop Experiment Reports,

O. S. =Original Survey ;

No.	District, Taluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formulæ.	AVERAGE PER ACRE.						Area of Test.
					Seed.	Yield of		Total Value of Produce.	Assessment excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.	
						Principal Product.	By-Product.				
1	2	3	4	5	6	7	8	9	10	11	12
	THA'NA.		Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.	A. g.
27	Salsette (Kálve) ... <i>Mr. R. A. L. Moore,</i> <i>Assistant Collector.</i>	Rice (Dodka), 13th November 1895.	16	1,600	46½	1,819 in husk.	116 head- loads.	42 0 11	5 4 2 O. S.	12·50	0 10
28	Máhim (Pálghar) ... <i>Mr. V. R. Patvardhan,</i> <i>District Deputy Collector.</i>	Do. (Halvi Patni), 6th November 1895.	16	1,600	69	1,606 Do.	1,910	38 12 0	3 7 0 O. S.	8·87	0 4
29	Do. (do.) ...	Do. (Halva Kolum by a), 6th November 1895.	18	1,800	62	2,310 Do.	3,500	70 2 6	3 11 8 O. S.	5·31	0 4
30	Do. (do.) ...	Paspalum scrobiculatum (Kodra), 6th November 1895.	18	720	51	1,551	2,475	11 14 0	3 7 0 O. S.	28·94	0 8

Northern Division, 1895-96—concluded.

R. S.=Revision Survey.

Equivalent in Tolas of local measure Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
	Principal Product.	By- Product.	
13	14	15	16
Tolas.	Lbs.	Cwts.	
39½	48¾ 6	25 head- loads.	<i>Experiment No. 27.</i> —Unmanured rice, <i>Dodka</i> , on high-lying black soil growing the same crop every year without a second crop. Seed-bed, the extent of which could not be ascertained, was manured with dry fish (<i>kuta</i>). Season favourable and tillage good. Outturn 18 annas according to the formulæ standard. No sample received as required by standing orders.
54	44½ 3	6¾	<i>Experiment No. 28.</i> —Continuous rice, <i>Halvi Patni</i> , on ordinary black <i>kharif</i> unmanured land. 7 gunthas of seed-bed, rábed with 6 cart-loads each of cow-dung and dried grass, supplied seedlings for an acre of plantation. Season and tillage both good.
53	34½ 3	8¾	<i>Experiment No. 29.</i> —Rice, <i>Halva Kolumbya</i> , on similar soil growing the same crop every year. 62 lbs. of seed, put on 3 gunthás of seed-bed rábed with 3 cart-loads of cow-dung and dried grass each, raised seedlings sufficient for an acre of field. Season and tillage as above. Outturn more than 300 lbs. over the maximum of the formulæ.
56	137¾ 5	35½	<i>Experiment No. 30.</i> — <i>Harik</i> or <i>kcdra</i> on <i>murmát kharif</i> uneven soil said to be unsuitable for rice or any other better crop and growing <i>harik</i> continuously for three years and then lying fallow for about 8 to 10 years. Seed-rate very high. Outturn nearly double the maximum of the formulæ. Grain and straw valued very cheap. Incidence high.

Summary of Crop Experiment Reports,

O. S. = Original Survey;

No.	District, Táluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formula.	AVERAGE PER ACRE.						Area of Test.
					Seed.	Yield of		Total Value of Produce.	Assessment, excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.	
						Principal Product.	By-Product.				
1	2	3	4	5	6	7	8	9	10	11	12
	KHARNDESH.		Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.	A. g.
	<i>Mr. K. R. Bomanji, Assistant Collector.</i>										
31	Sindkheda (Akadse)	Wheat (Gore), 26th January 1896.	8	200	77	342	766	11 2 5	2 11 1 R. S.	24.14	0 15
32	Do. (do.) ...	Do. do. ...	8	200	70	356	923	12 0 6	2 14 1 R. S.	23.93	0 10
	<i>Mr. J. H. DuBoulay, Assistant Collector.</i>										
33	Pimpalner (Badne)	Sesamum (Til), 31st October 1895.	8	140	2	61 seed.	...	3 5 4	0 5 9 O. S.	10.78	0 10
34	Do. (do.) ...	Spiked millet (Bájri), 31st October 1895.	6	100	5	302	800	7 8 0	0 7 1 O. S.	5.90	0 8
35	Do. (do.) ...	Do. do. ...	4	60	6	318	800	7 8 7	0 6 9 O. S.	5.59	0 8
36	Sháháda (Sárang-khede).	Wheat (Gore), 23rd January 1896.	4 to 5	70 to 90	79	329	...	7 13 11	2 13 1 O. S.	35.80	0 8
37	Do. (do.) ..	Do. do. ...	4	70	95	68	...	1 7 9	2 12 8 O. S.	188.07	0 8
38	Do. (Dhurkhede)	Do. 24th February 1896.	11	390	76	342	...	10 3 0	2 5 7 O. S.	23.05	0 10
	<i>Mr. G. W. Hatch, Assistant Collector.</i>										
39	Bhusával (Kandári)	Spiked millet (Bájri), 16th October 1895.	8	160	4	259	1,600	9 5 4	1 12 1 R. S.	18.80	0 10
40	Do. (do.) ...	Sesamum (Pándhara Til), 16th October 1895.	16	560	3	460 seed.	...	25 5 4	1 2 5 R. S.	4.54	0 10

Central Division, 1895-96.

R. S. = Revision Survey.

Equivalent in Tolas of local measure Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
	Principal Product.	By Product.	
13	14	15	16
Tolas.	Lbs.	Cwt.	
146	40	2 $\frac{2}{3}$	<i>Experiment No. 31.</i> —Dry-crop wheat, <i>Gore gahu</i> , on unmanured black but slightly sandy soil growing during the past 3 years (1) <i>bājri</i> , (2) cotton and (3) wheat and linseed. Season bad owing to lack of late rains; tillage fair. Seed-rate high. Outturn 11 annas according to the formulæ standard.
146	40	2 $\frac{2}{3}$	<i>Experiment No. 32.</i> —Same crop on similar land under the same rotation. Field manured with 19 cart-loads per acre of cattle droppings. Other conditions as above. Sample <i>ser</i> forwarded to this office weighed 5 <i>tolas</i> in excess of the reported weight.
120	18 $\frac{1}{2}$	...	<i>Experiment No. 33.</i> —Sesamum on unmanured poor light <i>kankari</i> soil growing <i>bājri</i> , <i>til</i> , and occasionally cotton. Season bad for want of rain, and tillage indifferent. Outturn 5 annas of the formulæ.
147	48 $\frac{1}{4}$	5 $\frac{1}{7}$	<i>Experiment No. 34.</i> — <i>Bājri</i> on similar but slightly superior soil lightly dressed with 2 $\frac{1}{2}$ cart-loads of sheep-dung per acre. Rotation and season as above. Tillage good. Seed-rate low. Outturn represents an 11-anna crop. Grain valued rather cheap in this and the following tests.
144	50 $\frac{3}{4}$	5 $\frac{1}{7}$	<i>Experiment No. 35.</i> — Do. do. do.
72 $\frac{1}{2}$	47 $\frac{1}{2}$	...	<i>Experiment No. 36.</i> —Dry-crop wheat, <i>Gore</i> , on good black soil manured with 17 cart-loads of cow-dung per acre and growing irregularly cotton and wheat in rotation. Season very unfavourable owing to absence of late rains, and tillage not very careful. Seed-rate high. Outturn 11 annas according to the formulæ standard.
70 $\frac{1}{2}$	57 $\frac{1}{6}$	...	<i>Experiment No. 37.</i> —Same crop on similar but unmanured soil. Rotation, season, &c., as above. Yield very poor, realizing only half the Government assessment.
71	38 $\frac{1}{5}$	...	<i>Experiment No. 38.</i> —Same crop on somewhat inferior <i>raichikan</i> unmanured soil. Other conditions as above. Field selected as representing an average crop of the <i>tāluka</i> this year.
70	43	4 $\frac{2}{7}$	<i>Experiment No. 39.</i> — <i>Bājri</i> on unmanured poor light soil growing <i>jowāri</i> , cotton and <i>bājri</i> in indefinite rotation. Season unfavourable owing to prolonged break in the middle of the monsoon; tillage indifferent. Seed-rate low.
59	18 $\frac{1}{7}$	...	<i>Experiment No. 40.</i> —White sesamum on fair black soil dressed with 7 $\frac{1}{2}$ cart-loads per acre of cow-dung and growing cotton alternately with <i>til</i> , linseed or <i>jowāri</i> . Crop apparently did not suffer much from the break noted above; tillage good. Outturn, compared to the formulæ, 14 annas.

Summary of Crop Experiment Reports,

O. S. = Original Survey ;

No.	District, Táluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formulæ.	AVERAGE PER ACRE.						Area of Test.
					Seed.	Yield of		Total Value of Produce.	Assessment, excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.	
						Principal Product.	By-Product.				
1	2	3	4	5	6	7	8	9	10	11	12
	KHANNDESH— <i>continued.</i> <i>Mr. G. W. Hatch,</i> <i>Assistant Collector</i> <i>—continued.</i>		Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.	A. g.
41	Jalgáon (Varan-gáon).	Wheat (Bansi), 30th January 1896.	4	70	80	236	240	9 9 8	3 5 6 R. S.	34.81	0 10
	<i>Mr. F. B. Young,</i> <i>Superintendent,</i> <i>L. R. and</i> <i>Agriculture, C.D.</i>										
42	Sávda (Faizpur) ...	Great millet (Jowári), 20th November 1895.	18	1,260	6½	566	4,800 kadbi. 175 chaff.	20 13 0	2 7 1 R. S.	11.73	0 8
43	Do. (do.) ...	Do. (do.).	19	1,330	5½	591	3,590 kadbi. 175 chaff.	20 10 0	2 5 6 R. S.	11.36	0 8
	NA'SIK. <i>Mr. R. B. Stewart,</i> <i>Assistant Collector.</i>										
44	Málegaon (Sang-meshvar).	Spiked millet (Báji), 26th October 1895.	16	640	6	1,578	5,610	28 9 6	8 8 0 O. S.	29.79	0 8
45	Do. (Dábhádi) ...	Great millet (Jowári), 23rd January 1896.	6	150	2½	118	1,200	5 12 6	1 1 5 O. S.	18.82	0 8
	<i>Mr. C. M. Thatte,</i> <i>District Deputy</i> <i>Collector.</i>										
46	Násik (Nándur Bahule).	Groundnut (Bhaimug), 11th December 1895.	11	1,400	49½	1,456 in shell	2,761	43 1 0	2 13 0 O. S.	6.53	0 5
47	Dindori (Dindori)...	Do. 11th January 1896.	11	1,400	60	1,543 in shell	2,976	45 2 2	3 8 6 R. S.	7.82	0 5

Central Division, 1895-96—continued.

R. S. = Revision Survey.

Equivalent in Tolas of local measure Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
	Principal Product.	By Product.	
13	14	15	16
Tolas,	Lbs.	Cwts.	
142	29½	1½	<i>Experiment No. 41.</i> —Dry-crop wheat, <i>Bansi</i> , on unmanured rich black soil growing mostly wheat and cotton in years of favourable rainfall only. Field manured three years ago. Season unfavourable owing to lack of September-October rain; tillage fair. Seed-rate very high. Outturn 9 annas according to the formulæ. Incidence high, due to poor crop. Sample weighed 2½ <i>tolas</i> in excess of the reported weight.
138	42½	6¼ kadbi. 2½ chaff.	<i>Experiment No. 42.</i> —Kharif <i>jowári</i> mixed with <i>udid</i> on unmanured good black soil growing, without any fixed rotation, cotton, <i>jowári</i> , wheat and <i>bájrí</i> with pulse mixtures. Season fair; tillage somewhat indifferent. Outturn exclusive of the untested minor crop much overestimated, being only 1½ annas of the formulæ standard.
128	39½	6¼ kadbi. 2½ chaff.	<i>Experiment No. 43.</i> —Same crop with <i>mug</i> on similar soil under the same rotation. Field dressed this year with 8 or 9 cart-loads of cattle manure per acre. Tillage good. Other conditions as above. Sample forwarded to this office weighed 2 <i>tolas</i> short of the reported weight.
152	62½	15	<i>Experiment No. 44.</i> — <i>Bájrí</i> on rich black soil manured with 3 cart-loads per acre of cattle manure and household refuse and growing <i>bájrí</i> followed by gram or <i>methi</i> assisted by irrigation. Rainfall scanty at commencement, but the test crop regularly watered from a <i>bandhára</i> ; tillage good. Seed-rate low. Outturn nearly double the maximum of the formulæ (800 lbs.). Grain valued very cheap. Incidence on the first crop alone. Sample of grain not received.
132	54½	3	<i>Experiment No. 45.</i> —Rabi <i>jowári</i> on unmanured ordinary black soil growing <i>jowári</i> and linseed in alternate years. Tillage good, but season very unfavourable owing to failure of late rains. Seed-rate low. Outturn poor.
80 weight.	41½	3	<i>Experiment No. 46.</i> —Groundnut on black <i>Bágáyat</i> soil well manured with 40 carts per acre of ordinary manure and growing during the previous three years (1) onions, (2) groundnut and (3) <i>bájrí</i> . Crop watered by well and <i>pát</i> water, but the extent of irrigation not ascertained. Season and tillage both good. The experimenter forwarded samples of kernels while the test was taken on unshelled product.
Do.	41½	3½	<i>Experiment No. 47.</i> —Same crop on similar soil liberally dressed with 50 carts per acre of ordinary manure and growing (1) onions, (2) groundnut and (3) wheat. Field irrigated by <i>pát</i> water only. Other remarks as above.

Summary of Crop Experiment Reports,

O. S.=Original Survey;

No.	District, Táluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formula.	AVERAGE PER ACRE.						Area of Test.
					Seed.	Yield of		Total Value of Produce.	Assessment, excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.	
						Principal Product.	By-Product.				
1	2	3	4	5	6	7	8	9	10	11	12
	AHMADNAGAR		Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.	A. g.
	<i>Mr. Sorábjí Padamji, Assistant Collector.</i>										
48	Sangamner (Nimgaon Jáli).	Great millet (Jowári, Shálu), 5th February 1896.	8	240	4½	471	375 bundles kadbi. 60 chaff.	11 9 0	0 8 9 R. S.	4.73	0 8
49	Do. (Aurangpor).	Do. 6th February 1896.	8	240	6½	392	325 bundles kadbi. 67 chaff.	9 13 6	0 14 10 R. S.	9.42	0 8
	<i>Mr. R. C. Brown, Assistant Collector.</i>										
50	Párner (Párner) ...	Great millet (Jowári), with safflower (Kardai), 6th February 1896.	8	200	6	338	325 bundles. 3½ seed	10 0 4	0 6 0 R. S.	3.76	0 8
51	Do. (do.) ...	Do. do. ...	10	310	4	470	390 bundles. 1½ seed.	12 13 5	0 8 7 R. S.	4.17	0 8
52	Do. (do.) ...	Do. do. ...	10	310	37	404	350 bundles. 14¾ seed.	11 12 4	0 4 6 R. S.	2.43	0 8
	<i>Mr. L. M. Deshpánde, District Deputy Collector.</i>										
53	Nevása (Tákli bháo).	Great millet (Dagdi Jowári), 20th February 1896.	12	650	8	1,193	3,250 kadbi. 220 chaff.	22 6 3	0 14 3 R. S.	3.97	0 8
54	Do. (Bhokar) ...	Do. 21st February 1896.	10	400	8	759	5,350 kadbi. 262 chaff.	19 11 1	0 14 4 R. S.	4.55	0 8
55	Kopargáo (Vári) ...	Do. (Kálbondi Jowári), 27th February 1896.	8	260	5	409	1,754 kadbi. 200 chaff.	14 4 5	0 13 0 R. S.	5.69	0 8

Central Division, 1895-96—continued.

R. S.—Revision Survey.

Equivalent in Tolas of local measure Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
	Principal Product.	By- Product.	
13	14	15	16
Tolas.	Lbs.	Cwts.	
102	62 $\frac{7}{10}$	100 bundles.	<i>Experiment No. 48</i> —Late <i>jowári</i> with a sprinkling of <i>kardai</i> on <i>mál</i> land growing, without manure, <i>bájrí</i> and <i>jowári</i> with the usual pulse mixtures in alternate years. Scarcely any rain fell after sowing, and safflower failed entirely; tillage good. Seed-rate low. Sample received in this office gave an excess of 4 <i>tolas</i> . Grain valued rather low.
102	62 $\frac{7}{10}$	100 bundles.	<i>Experiment No. 49</i> .—Same crop on unmanured black <i>gavháli</i> land growing <i>bájrí</i> followed by wheat and <i>jowári</i> and wheat in alternate years. Sample weighed 106 $\frac{1}{2}$ <i>tolas</i> in this office. Other remarks as above. Safflower yielded only the seed sown.
109 $\frac{5}{8}$	50 $\frac{3}{5}$ jowári. 32 kardai.	100 bundles.	<i>Experiment No. 50</i> .—Rabi <i>jowári</i> mixed with safflower on unmanured stony brownish soil growing <i>bájrí</i> and <i>jowári</i> alternately. Season unfavourable owing to insufficient late rains; tillage good. Seed-rate rather low. Sample <i>ser</i> weighed in this office 106 $\frac{3}{4}$ <i>tolas</i> only.
114 $\frac{1}{2}$	52 $\frac{11}{13}$ jowári. 32 $\frac{4}{5}$ kardai.	100 bundles.	<i>Experiment No. 51</i> .—Do. do. do. do. Seed-rate only half the usual rate. Outturn 12 annas of the formulæ standard. Sample weighed 6 $\frac{1}{2}$ <i>tolas</i> short in this office.
112 $\frac{1}{2}$	52	100 bundles.	<i>Experiment No. 52</i> .—Do. do. do. do. Seed-rate nearly four times the formulæ rate. Sample <i>ser</i> weighed in this office 105 <i>tolas</i> only.
112 $\frac{1}{2}$	72	5 $\frac{1}{2}$ kadbi. 2 $\frac{6}{7}$ chaff.	<i>Experiment No. 53</i> .—Rabi <i>jowári</i> , <i>Dagdi</i> , on unmanured black <i>kali gavháli</i> soil growing wheat and <i>jowári</i> with the usual pulse and oil-seed mixtures. Late rains deficient but the crop apparently suffered little. Outturn 18 annas according to the formulæ standard.
112 $\frac{3}{4}$	72	5 kadbi. 2 $\frac{6}{7}$ chaff.	<i>Experiment No. 54</i> .—Same crop on similarly assessed <i>kevtá</i> soil growing without manure wheat, <i>bájrí</i> and the usual mixtures. Season, &c., as above. Crop 13 annas according to the formulæ.
114	70 $\frac{1}{6}$	2 kadbi. 4 chaff.	<i>Experiment No. 55</i> .—Rabi <i>jowári</i> , <i>Kálbondi</i> , on unmanured brown <i>mál</i> land growing <i>jowári</i> and <i>bájrí</i> with mixtures. Late rains scanty; cultivation good. <i>Kadbi</i> valued high.

Summary of Crop Experiment Reports,

O. S.=Original Survey;

No.	District, Táluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formula.	AVERAGE PER ACRE.						Area of Test.
					Seed.	Yield of		Total Value of Produce.	Assessment, excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.	
						Principal Product.	By-Product.				
1	2	3	4	5	6	7	8	9	10	11	12
AHMADNAGAR —continued.											
<i>Mr. F. B. Young, Superintendent, L. R. and Agriculture, C. D.</i>											
56	Shevgáon (Shevgáon)	Great millet, (Dagdi Jowári), 21st February 1896.	20	1,300	20½	3,595	5,600 kadbi. 400 chaff.	86 3 0	1 4 5 R. S.	1.48	0 4
57	Akola (Aurangpur)	Wheat (Pivla) with safflower (Kardai) and common mustard (Mohari), 23rd January 1896.	16	640	45 2/3	504 21½ seed. 4	800	20 8 2	1 9 9 R. S.	7.84	0 10
POONA.											
<i>Mr. H. W. J. Bagnell, Assistant Collector.</i>											
58	Mával (Talegáon Dábháde).	Rice (Sál), 13th November 1895.	12	1,500	90	1,266 in husk.	3,360	24 13 1	3 11 3 R. S.	14.92	0 4
59	Mával (do.) ...	Eleusine coracana (Halvi Nágli), 13th November 1895.	16	1,200	9	908	1,370	19 8 9	0 14 5 R. S.	4.61	0 8
60	Haveli (Bhámburde).	Spiked millet (Bájri), with great millet (Hundi Jowári), 30th October 1895.	10	250	28	672 121	3,040	24 1 0	1 7 5 R. S.	6.08	0 8
<i>Mr. E. Carmichael, Assistant Collector.</i>											
61	Purandhar (Ambodi)	Spiked millet (Bájri), 6th November 1895.	6	100	5	323	1,380	10 2 6	1 4 6 R. S.	12.61	0 8
62	Do. (Pur) ...	Eleusine coracana (Náchni), 15th November 1895.	9	335	3	856	975	13 11 3	0 6 3 R. S.	2.85	0 8

Central Division, 1895-96—continued.

R. S.—Revision Survey.

Equivalent in Tolas of local measure Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
	Principal Product.	By- Product.	
13	14	15	16
Tolas.	Lbs.	Cwts.	
114	52 $\frac{3}{4}$	3 kadbi. 5 $\frac{1}{2}$ chaff.	Experiment No. 56.—Rabi jowári, Dagdi, on friable blackish garden soil, locally known as <i>sanvat</i> , liberally dressed with 40 carts per acre of compost of cattle-dung ashes and refuse. Rotation undefined. Crop regularly watered from an old well built before settlement; tillage good. Seed-rate rather high. Outturn excellent, being nearly three times the formulæ dry-crop maximum. Sample <i>ser</i> received in this office weighed 5 <i>tolas</i> short of the recorded weight.
117 wheat.	29 $\frac{1}{4}$ wheat.	3	Experiment No. 57.—Unirrigated yellow wheat with safflower and mustard on good black soil growing jowári, bájri and variety of pulses in indefinite rotation. Part of the field lightly dressed with about 2 carts manure per acre. Season somewhat unfavourable; cultivation good. Outturn, compared to the formulæ, 13 annas.
70 kardai.	30 $\frac{1}{2}$ kardai.		
100 mustard.	20 $\frac{1}{2}$ mustard.		
79	56 $\frac{3}{4}$	12	Experiment No. 58.—Inferior rice, Sál, on pándhri bhurki soil growing the same crop every year. Field manured once in four years. Proportionate area of seed-bed to acre of plantation not ascertained. Season and tillage good. Seed-rate high. Sample 6 <i>tolas</i> short of the recorded weight. By-product valued very cheap.
88	49 $\frac{3}{4}$	9 $\frac{3}{4}$	Experiment No. 59.—Nágli on light-coloured soil growing usually nágli and occasionally til. Seed-bed rábed with cow-dung and grass; quantities of materials used not recorded. Season and tillage both good. Outturn 13 annas according to the formulæ standard.
92 bájri.	37 $\frac{1}{4}$ bájri.	7 $\frac{1}{4}$	Experiment No. 60.—Bájri mixed with jowári on mixed black soil dressed with 26 carts per acre of cow-dung and growing apparently bájri and gram every year. Season and tillage fair. Seed-rate very high. Outturn represents about maximum of the formulæ. •Quantity of manure said to have been applied of very doubtful accuracy.
94 jowári.	48 $\frac{1}{2}$ jowári.		
95	39	6 $\frac{1}{4}$	Experiment No. 61.—Bájri on unmanured medium friable black soil growing jowári, wheat and bájri—the last followed by second crop only in years of ample rainfall. Season unfavourable and tillage indifferent. Seed-rate low. Crop 11 annas according to the formulæ. Sample <i>ser</i> gave a difference of 3 $\frac{1}{2}$ <i>tolas</i> .
89	64	28	Experiment No. 62.—Náchni on stony black <i>mal</i> land lightly manured with 3 cart-loads per acre of ordinary manure and growing <i>sáva</i> , <i>náchni</i> and <i>jowári</i> during the past three years. Area of seed-bed, which was rábed, not ascertained. Season unfavourable at first, but later rains saved the crop. Tillage good. Seed-rate rather low. Crop represents a 13-anna formulæ outturn. Sample <i>ser</i> 5 <i>tolas</i> short of the recorded weight.

Summary of Crop Experiment Reports,

O. S. = Original Survey ;

No.	District, Taluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formula.	AVERAGE PER ACRE.						Area of Test.
					Seed.	Yield of		Total Value of Produce.	Assessment, excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.	
						Principal Product	By-Product.				
1	2	3	4	5	6	7	8	9	10	11	12
	POONA—continued.		Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.	A. g.
	<i>Mr. E. Carmichael, Assistant Collector</i> —continued.										
53	Sirur (Shikrapur) ...	Gram, 7th February 1896.	10	190	30	635	350	18 2 8	4 6 2 R. S.	24.14	0 8
	SHOLA'PUR.										
	<i>Mr. B. C. H. O. Kennedy, Assistant Collector.</i>										
64	Barsi (Hingni) ...	Linseed (Javas), 30th January 1896.	10	155	4	348 seed.	...	16 13 3	0 11 4 R. S.	5.57	0 8
65	Do. (do.) ...	Gram, 30th January 1896.	8	130	30	387	...	9 2 11	0 13 7 R. S.	9.24	0 8
66	Do. (Pangre) ...	Pigeon Pea (Tur), 15th February 1896.	8	160	6½	760	...	15 15 0	0 9 10 R. S.	3.85	0 8
	<i>Mr. G. Scott, District Deputy Collector.</i>										
67	Pandharpur (Pandharpur).	Sesamum (Til), 12th November 1895.	16	560	2¾	121 seed.	282	6 10 8	0 3 8 R. S.	3.44	0 8
68	Malsiras (Tondle) ...	Gram, 17th January 1896.	14	400	26	429	...	11 13 0	0 7 3 R. S.	3.83	0 8
69	Do. (Malsiras)...	Linseed (Javas), 1st February 1896.	11	195	21	219 seed.	...	11 10 8	0 11 6 R. S.	6.16	0 8

Central Division, 1895-96—continued.

R. S. = Revision Survey.



Equivalent in Tolas of local measure Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
	Principal Product.	By- Product.	
13	14	15	16
Tolas.	Lbs.	Cwts.	
99	35½	10	<i>Experiment No. 63.</i> —Gram as second crop on slightly reddish black soil. Test crop irrigated twice from a <i>kachha bandhara</i> at one month's interval. No manure applied this year, but 15 carts per acre of ordinary manure were put on in the previous year. The field grew <i>bajri</i> , groundnut and <i>jowari</i> during the past three years and no second crop. Season favourable and tillage good. Outturn full average according to the formulæ. Incidence on the second crop alone.
124	20½	...	<i>Experiment No. 64.</i> —Linseed on unmanured blackish brown <i>morend</i> soil growing <i>jowari</i> for the past three years. Season fair and cultivation ordinary. Seed-rate very low. Outturn 15 annas according to the formulæ. Sample, weighed in this office, gave an excess of 3 <i>tolas</i> .
143	42½	...	<i>Experiment No. 65.</i> —Unirrigated and unmanured gram on similar soil growing the same crops as above. Season and tillage as above. Outturn represents a 12-anna crop of the formulæ. Sample weighed 6½ <i>tolas</i> in excess of the recorded weight. Hence figures doubtful.
155	47½	...	<i>Experiment No. 66.</i> — <i>Tur</i> on similar soil growing without manure (1) <i>jowari</i> , (2) groundnut and (3) <i>tur</i> . Season as above; tillage fair. Seed-rate rather low. Crop yielded a 19-anna formulæ outturn. Sample weighed 159½ <i>tolas</i> in this office.
118	18½	4	<i>Experiment No. 67.</i> —Sesamum on unmanured brown <i>mal</i> soil growing <i>jowari</i> or <i>bajri</i> with pulses without regular rotation. Season average; tillage indifferent. Outturn poor, being only 7 annas of the formulæ standard.
145½	37½	...	<i>Experiment No. 68.</i> —Gram on deep black <i>chikan</i> soil dressed with 8 cart-loads per acre of farmyard manure and growing <i>bajri</i> and <i>rabi jowari</i> with pulse mixtures. Season as above; tillage good. Outturn 15 annas of the formulæ. Sample <i>ser</i> 3 <i>tolas</i> short of the recorded weight.
122	18½	...	<i>Experiment No. 69.</i> —Linseed with safflower in rows (7:1) on unmanured black soil growing <i>bajri</i> and <i>rabi jowari</i> with pulses and oil-seeds. The test crop grown for the first time on the field. Season and tillage as above. Seed-rate high. Outturn, exclusive of safflower, which was not tested, represents a 12-anna crop of the formulæ.

Summary of Crop Experiment Reports,

O. S. = Original Survey ;

No.	District, Taluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formulæ.	AVERAGE PER ACRE.						Area of Test.
					Seed.	Yield of		Total Value of Produce.	Assessment, excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.	
						Principal Product.	By-Product.				
1	2	3	4	5	6	7	8	9	10	11	12
	SATARA.		Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.	A. g.
70	Sátára (Rohát) ...	Wheat (Khapli), 11th February 1896.	16	1,040	88	485	...	19 5 6	4 8 0 R. S.	23.26	0 4½
71	Jávli (Medha) ...	Do. (Pota), 22nd February 1896.	16	1,040	136	659	...	20 7 7	2 12 1 R. S.	13.45	0 4
72	Do. (do.) ...	Do. do. ...	18	1,170	156	934	...	28 1 6	5 9 11 R. S.	20.00	0 4
	<i>Mr. J. M. Cursetji,</i> <i>District Deputy Collector.</i>										
73	Khatáv (Vaduj) ...	Groundnut (Bhuimug), 16th January 1896.	11	1,400	108	1,547 in shell	242	72 5 2	2 14 4 R. S.	4.00	0 10
74	Khánápur (Yede)...	Gram, 5th February 1896.	16	560	114	640	584	17 2 6	1 11 0 R. S.	9.83	0 10
75	Khatáv (Khatáv) ...	Great millet (Jowári Shalu), 5th March 1896.	18	1,260	17	3,069	8,004	105 12 1	1 2 7 R. S.	1.09	0 10

Central Division, 1895-96—concluded.

R. S. = Revision Survey.

Equivalent in Tolas of local measure Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
	Principal Product.	By- Product.	
13	14	15	16
Tolas.	Lbs.	Cwts.	
115	25	...	<i>Experiment No. 70.</i> —Spelt wheat, <i>Khapli</i> , as second crop after <i>sáva</i> on unmanured reddish soil which grew during the last 3 years (1) <i>shálu jowári</i> , (2) groundnut and (3) <i>shálu jowári</i> . Manure applied only once in 3 or 4 years. Crop irrigated 4 times from a <i>pát</i> . Season moderately favourable and tillage fairly good. Seed-rate high. Crop 10 annas according to the formulæ standard. Incidence on second crop alone.
119½	32½	...	<i>Experiment No. 71.</i> —Wheat, <i>Pota</i> , as second crop after rice on land growing rice followed usually by field pea. A portion of the field under wheat had been rábed for a seed-bed for rice. Soil retentive of moisture and crop watered only once. Seed-rate very high. Crop 12 annas of the formulæ. Incidence moderate being on second crop only.
123½	33½	...	<i>Experiment No. 72.</i> —Same crop on similar soil growing rice followed by wheat. The field low-lying and highly retentive of moisture. Over 6½ gunthas of the field, which grew wheat, 10 baskets of cow-dung were spread before the rice. Outturn represents a 15-anna crop of the formulæ. Other remarks as above. Sample <i>ser</i> weighed 2½ <i>tolas</i> short of the recorded weight.
78 weight.	24	½	<i>Experiment No. 73.</i> —Groundnut on <i>Bágáyat Pándhri du mati</i> soil growing every year sugarcane, groundnut, millets, chillies, garlic, wheat, <i>ratalu</i> , &c. 500 sheep folded for 12 days on the field, which besides was dressed with 12 cart-loads of cow-dung and ashes. Crop watered 5 times from a well and also from a <i>dharan</i> . Season very bad; tillage fair. Seed-rate high. Figures in column 7 are for unshelled nuts; while the sample sent to this office was of kernels.
117	39	7	<i>Experiment No. 74.</i> —Gram on <i>Jiráyat</i> black soil manured every other year with 8 cart-loads per acre of ordinary manure and with sheep folding and growing <i>bájrí</i> , wheat, <i>jowári</i> , gram and other pulses every year. Season unsatisfactory owing to heavy late rains; tillage good. Seed-rate extremely high. Outturn 18 annas of the formulæ.
110	36½	3¾	<i>Experiment No. 75.</i> —Irrigated <i>jowári</i> on ordinary black soil enriched with 24 carts of fresh soil from another field and heavily folded with 1,000 sheep per acre for 6 nights. The field grows <i>jowári</i> and groundnut alternately. Crop watered from irrigational canal. Season unfavourable owing to late heavy rains. Tillage very good. Seed-rate very high. Outturn unusually high—more than double the maximum of the formulæ. Grain and <i>kadbi</i> both valued very high. Sample received in this office weighed 99 <i>tolas</i> only; hence outturn figures doubtful.

Summary of Crop Experiment Reports,

O. S.=Original Survey;

No.	District, Taluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formula.	AVERAGE PER ACRE.						Area of Test.
					Seed.	Yield of		Total Value of Produce.	Assessment, excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.	
						Principal Product.	By-Product.				
1	2	3	4	5	6	7	8	9	10	11	12
	BELGAUM.		Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.	A. g.
	<i>Mr. A. S. A. Westropp,</i> <i>Assistant Collector.</i>										
76	Chikodi (Hukeri) ...	Great millet (Karsal Jowári) and Kidney bean (Matki), 28th November 1855.	10	435	2½	567	...	23 13 7	0 15 0 R. S.	3.93	0 8
77	Do. (do.) ...	Spiked millet (Bájni), 28th November 1895.	8	160	4	314	...	9 4 4	0 9 1 R. S.	6.12	0 4
78	Belgaum (Sutgatti) .	Gram, 1st February 1896.	11	230	16	357	...	11 0 0	1 12 3 R. S.	16.05	0 4
	<i>Mr. N. C. Soman,</i> <i>District Deputy Collector.</i>										
79	Athni (Savdi) ...	Great millet (Rabi Jowári), 29th January 1896.	18	1,260	4	472	806 kadbi. 124 chaff.	14 6 8	0 15 9 R. S.	7.13	0 10
80	Gokák (Sundoli) ...	Do. 15th February 1896.	20	1,400	12	1,856	1,590 kadbi. 264 chaff.	45 8 0	1 2 5 R. S.	2.53	0 10
81	Athni (Savdi) ...	Gram and safflower, 29th January 1896.	20 16	700	34 2½	543 123 seed.	264	16 14 4	1 1 5 R. S.	6.44	0.10
	<i>Mr. J. L. Lushington,</i> <i>Superintendent, L. R. and Agriculture, S. D.</i>										
82	Samgaon (Mugut-khan Hubli).	Wheat (Gode), 17th January 1896.	8	200	42	489	537 straw. 310 chaff.	16 8 5	2 9 0 R. S.	15.50	0 8
83	Do. (Nan-gundikopp).	Gram, 6th January 1896.	8	140	31	172	...	6 11 5	0 9 3 R. S.	8.61	0 8
84	Do. (do.) ...	Pigeon pea (Yur), 20th January 1896.	16	640	7½	82	175	3 6 0	2 10 0 R. S.	77.7	1 24

Southern Division, 1895-96.

R. S. = Revision Survey.

Equivalent in Tolas of local measure Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
	Principal Product.	By- Product.	
13	14	15	16
Tolas.	Lbs.	Cwts.	
85	52 $\frac{1}{2}$	...	<i>Experiment No. 76.</i> —Kharif <i>jowári</i> with pulses in every fourth row on reddish light friable stony soil lightly treated with 6 carts per acre of cow-dung and sweepings and growing <i>jowári</i> for 3 years followed by chillies in the fourth year. Season only fair owing to heavy rain during the flowering period; cultivation indifferent; seed-rate low. <i>Tur</i> being unripe not tested, but its value included in column 9.
90 $\frac{1}{4}$	46 $\frac{1}{2}$	...	
84 $\frac{3}{8}$	49 $\frac{1}{2}$	...	
84 $\frac{1}{2}$	32 $\frac{1}{2}$	...	<i>Experiment No. 77.</i> — <i>Bájrí</i> with <i>kulthí</i> in every fourth row on unmanured soils similar to the above but less stony, growing <i>jowári</i> and <i>bájrí</i> alternately. Season and tillage as above. Crop 11 annas according to the formulæ. Subordinate crop was almost a failure. Test area below the prescribed minimum.
80 $\frac{1}{8}$	49 $\frac{1}{2}$	1 $\frac{3}{4}$ kadbi. 1 $\frac{1}{4}$ chaff.	<i>Experiment No. 78.</i> —Unirrigated gram with safflower on blackish friable unretentive soil lightly dressed with 2 carts per acre of cow-dung and growing <i>jowári</i> followed by wheat and gram in alternate years. Field brought under cultivation 6 years ago. Season good; cultivation fair. Seed-rate low. Crop 13 annas according to the formulæ standard. Safflower, which occupied about $\frac{1}{10}$ of the area, not tested, being unripe. As above test area only half the prescribed minimum.
78	48	2 $\frac{1}{2}$ kadbi. 1 $\frac{3}{4}$ chaff.	<i>Experiment No. 79.</i> —Rabi <i>jowári</i> on unmanured soft black soil growing <i>jowári</i> , pulses, oil seeds and cotton in indefinite rotation. Field usually flooded by the Krishna but not this year. Late rains somewhat scanty; cultivation good. Outturn 11 annas only according to the formulæ.
84	43	4 $\frac{1}{2}$	<i>Experiment No. 80.</i> —Rabi <i>jowári</i> with pulse mixtures on similar soil inundated by a river and manured with 20 carts per acre of cattle manure and household refuse and growing every year the same crop. Season and tillage both good. Seed-rate high. Outturn full maximum of the formulæ. Sample <i>ser 2 tolas</i> short. Subordinate pulses failed entirely.
63	32 $\frac{1}{2}$	...	
83	38 $\frac{1}{2}$	2	<i>Experiment No. 81.</i> —Gram mixed with safflower in every sixth row on black soil under similar conditions growing <i>jowári</i> and gram with pulse mixtures and cotton in indefinite rotation. Seed-rate rather high. Sample <i>ser</i> of gram received in this office weighed 3 <i>tolas</i> in excess of the reported weight. Other conditions as in Exp. No. 79. Safflower, which ripened later, tested by a Circle Inspector.
84	27	...	<i>Experiment No. 82.</i> —Dry-crop wheat on black but rather clayey stiff soil dressed with 5 carts per acre of cow-dung and sweepings and growing <i>jowári</i> alternately with wheat or cotton. Season very moderate and tillage fair. Crop 12 annas according to the formulæ.
88	45 $\frac{1}{2}$	1 $\frac{5}{7}$	<i>Experiment No. 83.</i> —Unirrigated gram on brown soil with a stony surface, locally known as <i>hulkeri masári</i> , lightly manured with about 2 to 3 carts per acre of cow-dung and sweepings. Season unfavourable; tillage fairly good. Pulse valued very high. By-product not weighed but valued at 5 annas.
			<i>Experiment No. 84.</i> — <i>Tur</i> subordinate to <i>jowári</i> on slightly clayey black soil manured with 3 cart-loads per acre of cow-dung and sweepings and growing the same crops year after year. Season and tillage both good. Seed-rate high. Percentage very high, because the test crop occupied only the eighth row in the mixture.

Summary of Crop Experiment Reports,
O. S. = Original Survey;

No.	District, Táluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formula.	AVERAGE PER ACRE.						Area of Test.
					Seed.	Yield of		Total Value of Produce.	Assessment, excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.	
						Principal Product	By-Product.				
1	2	3	4	5	6	7	8	9	10	11	12
	BIJA'PUR.		Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.	A. g.
	<i>Mr. G. D. Pánse,</i> <i>Assistant Collector.</i>										
85	Bágalkot (Halur) ...	Great millet (K h a r i f Jowári), 14th November 1895.	16	1,040	4 $\frac{1}{10}$	1,469	13,790 kadbi. 964 chaff.	41 9 4	0 10 11 R. S.	1.64	0 8
	<i>Mr. H. Page,</i> <i>Assistant Collector.</i>										
86	Sindgi (Kalkeri) ...	Wheat, 28th January 1896.	8	240	18 $\frac{3}{8}$	276	209	8 5 11	0 15 11 R. S.	11.88	0 9
87	Do. (do) ...	Linseed, 28th January 1896.	12	250	5 $\frac{1}{2}$	294 seed	...	12 9 7	0 15 11 R. S.	7.89	0 9 $\frac{1}{2}$
88	Do. (Sindgi) ...	Great millet (Late Jowári), 13th February 1896.	8	240	8	362	1,090	8 12 7	1 1 3 R. S.	12.27	0 8
	<i>Mr. R. C. Artál,</i> <i>District Deputy Collector.</i>										
89	Muddebíhál (Hul-lur).	Spiked millet (Báji), 26th November 1895.	14	540	3	619	2,183	9 10 1	0 10 9 R. S.	6.97	0 12
90	Bágevádi (Bágevádi).	Wheat, 1st February 1896.	10 to 12	375 600	31	379	450	9 4 6	1 0 10 R. S.	11.33	0 12
91	Bágevádi (Ukli) ...	Gram, 12th February 1896.	13 to 15	415 to 520	39	597	437	15 10 0	0 15 4 R. S.	6.13	0 11 $\frac{1}{4}$
92	Do. (do.) ...	Linseed (Javas), 12th February 1896.	12 to 14	250 to 335	6 $\frac{1}{8}$	190 seed	341	8 13 2	0 15 3 R. S.	10.95	0 11 $\frac{1}{4}$
93	Do. (do.) ...	Great millet, (Jowári), 13th February 1896.	10 to 12	400 to 650	3 $\frac{1}{2}$	389	1,405	8 14 11	1 0 4 R. S.	11.42	0 11 $\frac{1}{4}$

Southern Division, 1895-96—continued.

R. S. = Revision Survey.

Equivalent in Tolas of local measure Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
	Principal Product.	By- Product.	
13	14	15	16
Tolas.	Lbs.	Cwts.	
80	51 $\frac{1}{4}$	14 $\frac{2}{3}$	<i>Experiment No. 85.</i> —Kharif <i>jowári</i> with <i>tur</i> in every ninth row on ordinary black <i>yeri</i> soil manured with about 4 carts per acre of cow-dung and rubbish and growing usually <i>jowári</i> , but occasionally cotton also. Season good and tillage excellent. Yield exclusive of the subordinate untested <i>tur</i> more than maximum of the formulæ.
156	38	1 $\frac{1}{2}$	<i>Experiment No. 86.</i> —Dry-crop wheat with safflower after every eighth row on unmanured soft black soil growing <i>jowári</i> , cotton and wheat with pulses and oilseeds. Season fair; cultivation good. Seed-rate very low. Yield in column 7 exclusive of the subordinate crop, which was not tested. Sample weighed 2 <i>tolas</i> in excess of the recorded weight.
130	23 $\frac{1}{3}$	...	<i>Experiment No. 87.</i> —Linseed with safflower after every sixth row on another part of the above field manured with 6 $\frac{1}{4}$ cart-loads per acre of ordinary manure. Season good. Other remarks as above.
156	64	3 $\frac{1}{7}$	<i>Experiment No. 88.</i> —Late <i>jowári</i> on black soil not manured for the last 12 years and growing (1) cotton, (2) linseed and (3) cotton during the past 3 years. Season fair and cultivation good. Crop 10 annas of the formulæ.
154	67	46 $\frac{3}{4}$	<i>Experiment No. 89.</i> — <i>Bájrí</i> mixed with <i>kulthi</i> in every sixth row on unmanured sandy loam. The field was manured 4 or 5 years ago. Rotation undefined. <i>Jowári</i> and <i>bájrí</i> with pulses and seeds mostly grown. Season and cultivation both fair. Seed-rate low. Outturn represents a 16-anna crop according to the formulæ standard. Grain valued very cheap. Sample 4 $\frac{1}{2}$ <i>tolas</i> short of the recorded weight. Subordinate crop in this and the following 4 tests not taken into account.
151 $\frac{1}{2}$	42 $\frac{3}{4}$	9 $\frac{3}{5}$	<i>Experiment No. 90.</i> —Unirrigated wheat with safflower mixed in every seventh row on light black soil which is never manured. Rotation :—(1) late <i>jowári</i> , (2) safflower and (3) wheat grown during the past 3 years. Seed-rate low. Want of sufficient moisture due to shortness of late rain adversely affected the yield and reduced outturn to only 10 annas. Tillage good. Grain valued very low.
151 $\frac{1}{2}$	38 $\frac{3}{4}$	16	<i>Experiment No. 91.</i> —Unirrigated and unmanured gram with safflower in every eighth row on similar soil growing during the past 3 years (1) late <i>jowári</i> , linseed and hemp, (2) wheat and safflower and (3) <i>jowári</i> and linseed. Season and cultivation both good. Seed-rate rather high. Crop 17 annas according to the formulæ.
122 $\frac{7}{8}$	22	24 $\frac{1}{3}$	<i>Experiment No. 92.</i> —Linseed with safflower in every eighth row on similar soil. Rotation undefined. Season fair. Tillage as above. Seed-rate very low. Outturn middling, being only 11 annas of the formulæ standard.
137 $\frac{3}{4}$	56 $\frac{1}{2}$	4 $\frac{5}{7}$	<i>Experiment No. 93.</i> —Rabi <i>jowári</i> with linseed on similar soil. Rotation, &c., as above. Crop 10 annas.

Summary of Crop Experiment Reports,

O. S. = Original Survey;

No.	District, Táluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formulae.	AVERAGE PER ACRE.						Area of Test.
					Seed.	Yield of		Total Value of Produce.	Assessment, excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.	
						Principal Product.	By-Product.				
1	2	3	4	5	6	7	8	9	10	11	12
DHA'RWA'R.											
<i>Mr. F. G. Anderson, Assistant Collector.</i>											
94	Karajgi (Hatti mat-tur).	Great millet, (Pattan Shetti Jowari). 1st December 1895.	20	1,300	11	1,393	4,000	25 4 0	0 13 2 R. S.	3.25	0 5
95	Ráneennur (Kupelur).	Wheat, 2nd February 1896.	11 to 14	390 to 670	30	391	...	16 10 7	1 10 11 R. S.	10.09	0 8½
96	Hángal (Hángal) ...	Linseed, 10th March 1896.	12	250	14	244	...	11 0 0	2 9 2 R. S.	23.39	0 5
<i>Mr. K. N. Bhángáonkar, District Deputy Collector.</i>											
97	Gadag (Kadadi) ...	Wheat, 19th January 1896.	12	500	23½	381	426	13 11 9	1 0 2 R. S.	7.35	0 14
98	Ron (Nidgundi) ...	Gram, 31st January 1896.	8	140	20	162	58 chaff. 23 stalks.	5 6 5	1 0 3 R. S.	18.80	0 14
KOLA'BA.											
<i>Mr. R. E. Kánga, District Deputy Collector.</i>											
99	Alibág (Veshvi) ...	Rice (Patan Bhát), 14th November 1895.	14	1,675	117	3,045 in husk.	2,462	58 15 6	7 10 3 R. S.	12.95	0 8
<i>Mr. G. P. Thakár, District Deputy Collector.</i>											
100	Mángáon (Vinchavli).	Gram, 8th March 1896.	16	320	79	296	...	10 0 0	0 10 1 O. S.	6.30	0 8
101	Do. (Mángáon).	Do. 9th March 1896.	12	200	79	275	245	9 5 4	0 15 6 O. S.	10.38	0 8
<i>Mr. E. H. Hearn, Deputy Supt., Konkan Revenue Survey.</i>											
102	Roha (Poi) ...	Rice (Mudga), 15th November 1895.	18	2,700	...	2,062 in husk.	2,300 straw. 150 chaff.	36 4 2	6 12 2 O. S.	18.64	0 4

Southern Division, 1895-96—continued.

R. S. = Revision Survey.

Equivalent in Tolas of local measure Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
	Principal Product.	By- Product.	
13	14	15	16
Tolas.	Lbs.	Cwts.	
146	60	17½	<i>Experiment No. 94.</i> —Rabi <i>jowári</i> on brown soil lightly manured with 5 carts per acre of cattle-dung and refuse and growing cotton, wheat and <i>jowári</i> in irregular rotation. Season very favourable and tillage good. Crop full average. By-product abnormally cheap. Sample 3 <i>tolas</i> short of the reported weight.
145	25½	...	<i>Experiment No. 95.</i> —Dry-crop wheat on medium black soil dressed with a small quantity of manure and growing cotton, <i>jowári</i> and wheat in indefinite rotation. Season not quite favourable owing to excessive late rains. Tillage as above. Grain valued rather high.
136	22½	...	<i>Experiment No. 96.</i> —Linseed as second crop on second class rice land growing rice followed by second crop only in years of ample rainfall. Field manured as usual for the rice. Season only fair for want of sufficient late rains; tillage good. Incidence on the second crop alone. Sample <i>ser</i> weighed 2½ <i>tolas</i> in excess of the recorded weight.
152	35	1½	<i>Experiment No. 97.</i> —Dry-crop wheat with safflower in every seventh row on rich black soil lightly manured with 2½ cart-loads per acre of ordinary manure and growing <i>jowári</i> , cotton and wheat. Season favourable for rabi crops and tillage good. Seed-rate very low. Outturn exclusive of the subordinate crop which was not tested.
149	30½	8	<i>Experiment No. 98.</i> —Unirrigated and unmanured gram with safflower as above on inferior black soil growing <i>jowári</i> , Italian millet, cotton, wheat and pulses in indefinite rotation. Tillage good. Low outturn due to deficient rainfall.
55½	57	4	<i>Experiment No. 99.</i> —Rice on black <i>chikat</i> soil growing without manure the same crop every year followed by <i>vál</i> . 6 gunthas of seed-bed rábed with 40 cart-loads of cow-dung and 4 of rice straw provided seedlings for 35 gunthas of field. Season and tillage both good. Seed-rate very high. Outturn more than maximum of the formulæ. Incidence on the first crop alone.
77	29½	...	<i>Experiment No. 100.</i> —Gram on deep black <i>malkhandi rabi</i> land lightly manured with about 1½ cart-loads per acre of ordinary manure and growing the same crop every year. Season and tillage both good. Seed-rate very high. Sample <i>adholi</i> 3½ <i>tolas</i> in excess of the reported weight.
76½	29½	...	<i>Experiment No. 101.</i> —Same crop on black <i>galvat</i> soil growing without manure the same crop every year. Tillage indifferent. Other remarks as above.
60	61½	8	<i>Experiment No. 102.</i> —Rice, <i>Mudga</i> , on unmanured brown clayey soil growing the same crop every year. Seed sown in a seed-bed rábed as usual, but its extent and the quantity of seed used not ascertained. Season and tillage as above. Crop 14 annas according to the formulæ. Grain valued very cheap.

Summary of Crop Experiment Reports,

O. S.=Original Survey ;

No.	District, Táluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formula.	AVERAGE PER ACRE.						Area of Test.
					Seed.	Yield of		Total Value of Produce.	Assessment, excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.	
						Principal Product.	By-Product.				
1	2	3	4	5	6	7	8	9	10	11	12
			Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.	A. g.
	KOLA'BA— <i>continued.</i> <i>Mr. E. H. Hearn,</i> <i>Deputy Supt., Konkan</i> <i>Revenue Survey—</i> <i>continued.</i>										
103	Roha (Shedsai) ...	Pigeon pea (Tur), 18th December 1895.	16	480	6	320	280	10 4 0	0 4 0 O. S.	2.44	0 10
	<i>Mr. W. D. Wilkins,</i> <i>Asst. Supt., Konkan</i> <i>Revenue Survey.</i>										
104	Mahád (Akale) ...	Rice (Tavsál Halva), 16th November 1895.	16	2,400	29	1,075 in husk.	950	23 3 0	5 3 5 O. S.	22.49	0 4
	<i>Mr. J. A. McIver,</i> <i>Assistant Superin-</i> <i>tendent, Konkan</i> <i>Revenue Survey.</i>										
105	Máhád (Morgiri) ...	Rice (Divályia), 15th November 1895.	15	2,220	30½	1,602 Do.	592 bundles.	37 6 9	2 15 1 O. S.	7.86	0 5
	RATNA'GIRI. <i>Mr. A. W. G.</i> <i>Chuckerbutty,</i> <i>Assistant Collector.</i>										
106	Rájápur (Kondhe) ...	Niger-seed, 9th November 1895.	12	250	11	196 seed.	208	11 5 3	0 5 11 O. S.	3.26	0 8
107	Do. (do.)..	Do. do. ...	14	335	15	255 seed.	280	14 1 11	0 4 0 O. S.	1.77	0 5
108	Do. (do.)..	Elusine coracana (Late Rági) and Panicum miliari (Vari), 8th November 1895.	12	800	13½	747 83	692 27	21 5 1	0 5 10 O. S.	1.71	0 6

Southern Division, 1895-96—continued.

R. S.=Revision Survey.

Equivalent in Tolas of local measure Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
	Principal Product.	By- Product.	
13	14	15	16
Tolas.	Lbs.	Cwts.	
78	32	10	<i>Experiment No. 103.</i> — <i>Tur</i> on reddish soil on the top of a hill rábed with cow-dung and grass and growing (1) <i>nagli</i> or <i>vari</i> , (2) <i>tur</i> and (3) fallow for 2 or 3 years. Season and cultivation both good. Seed-rate low. Crop 13 annas. By-product valued very low.
63½	54	2¾	<i>Experiment No. 104.</i> —Continuous <i>Tavsal halva</i> rice on unmanured reddish brown soil. 2¾ gunthas of rábed seed-bed furnished seedlings for an acre of plantation. Season favourable and tillage good. Seed-rate very low. Crop only 11 annas according to the formulæ. Incidence rather high. Crop probably under average for the village and probably over-estimated at the average standard.
62	51	2¾	<i>Experiment No. 105.</i> — <i>Garva</i> rice, <i>Divályia</i> , on unmanured red gravelly soil growing rice every year, <i>Panvel</i> and <i>Divályia</i> rice alternately. Seed sown in a rábed seed-bed of 2½ gunthas which gave seedlings for 12½ gunthas of field. Late rains injured the crop. Tillage good. Straw valued high. Sample 2½ <i>tolas</i> short of the recorded weight.
29	19⅜	2⅜	<i>Experiment No. 106.</i> —Niger-seed on <i>bharad varkas</i> soil. Season and tillage good. Seed-rate high.
30⅜	19½	2½	<i>Experiment No. 107.</i> —Same crop on similar soil. Other remarks as above. Test area below the prescribed minimum.
38¾	43¾	3	<i>Experiment No. 108.</i> —Late <i>rági</i> mixed with <i>vari</i> on sloping stony <i>bharad varkas</i> land growing (1) <i>rági</i> , (2) <i>harik</i> , (3) niger-seed and (4) <i>sáva</i> followed by fallow for 3 or 4 years. Seed sown on rábed bed, area of which not ascertained. Dried fish applied as manure at time of transplantation. Season and cultivation both good. Outturn good. By-product valued high. Test area below the prescribed minimum.
31½	38¾	...	

Summary of Crop Experiment Reports,

O. S.=Original Survey;

No.	District, Táluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formula.	AVERAGE PER ACRE.						Area of Test.
					Seed.	Yield of		Total Value of Produce.	Assessment, excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.	
						Principal Product.	By-Product.				
1	2	3	4	5	6	7	8	9	10	11	12
RATNA GIRI— <i>continued.</i>											
<i>Mr. V. R. Kelkar,</i> <i>District Deputy Collector.</i>											
109	Ratnágiri (Shirgáon)	Elusine coracana (Rági), 9th October 1895.	14	1,080	8½	1,433	2,110	41 4 0	0 6 2 O. S.	0.93	0 8
110	Do. (Khánu)...	Niger-seed (Kárala), 3rd November 1895.	10	155	10½	150 seed.	...	6 13 0	0 4 1 O. S.	3.74	0 8
111	Do. (Math) ...	Do. 6th November 1895.	10	155	7¼	141 Do.	...	6 7 0	0 3 8 O. S.	3.56	0 8
112	Do. (Devrukh).	Paspalum scrobiculatum (Kodra), 18th November 1895.	10	250	25	736	...	7 5 9	0 6 8 O. S.	5.66	0 8
KA'NARA											
<i>Mr. N. B. Divátia,</i> <i>Assistant Collector.</i>											
113	Kárvár (Bád) ...	Rice (Ajga), 14th October 1895.	16	2,400	17½	3,013 in husk	4,462	54 4 0	4 1 10 O. S.	7.58	0 4
114	Do. (Virge). ...	Do. (Motalgo and Sarti), 11th November 1895.	12	1,500	93	441 Motalgo. 250 Sarti in husk	1,873	27 15 10	2 12 6 O. S.	9.93	0 4
<i>Mr. J. McNeill,</i> <i>Assistant Collector.</i>											
115	Kárvár (Bád) ...	Do. (Sanna Malgi), 25th October 1895.	18	2,700	135	3,210 Do.	5,430 straw. 57 chaff.	63 0 7	2 14 0 O. S.	4.56	0 4
116	Sirsi (Devimane) ...	Do. (Vommadlu), 14th December 1895.	16	1,600	94½	1,328 Do.	4,000 straw. 90 chaff.	35 9 4	2 2 10 O. S.	6.11	0 4
117	Kumta (Alkad) ...	Do. (Vaingan Hanaga), 31st March 1896.	16	...	64	1,124 Do.	4,070 wet straw.	30 3 2	5 5 2 O. S.	17.62	0 4

Southern Division 1895-96—concluded.

R. S.—Revision Survey.

Equivalent in Tolas of local measure Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
	Principal Product.	By- Product.	
13	14	15	16
Tolas.	Lbs.	Cwts.	
48 $\frac{7}{8}$	37 $\frac{3}{5}$	6	<i>Experiment No. 109.</i> — <i>Rāgi</i> on <i>bharad varkas</i> land which is being converted into Kharif and grows <i>nāgli</i> , <i>udid</i> , niger-seed and <i>harik</i> in rotation. 3 $\frac{1}{2}$ gunthas of seed-bed rābed as usual is said to have furnished seedlings for 21 gunthas of field at time of transplantation. Fish manure applied at time of transplantation. Season and cultivation both good. Outturn 18 annas of the formulæ.
43	22	...	<i>Experiment No. 110.</i> —Niger-seed on <i>māl varkas</i> land growing (1) <i>nāgli</i> , (2) <i>harik</i> , (3) niger-seed and (4) <i>sarvat</i> rice followed by fallow for 4 years. Season and tillage as above. Outturn poor, due apparently to the test crop being the last but one in rotation.
43	22	...	<i>Experiment No. 111.</i> —The same crop on <i>varkas</i> land under similar conditions.
48 $\frac{3}{4}$	100	...	<i>Experiment No. 112.</i> — <i>Harik</i> , the last crop of the series, on similar unmanured soil growing (1) <i>harik</i> , (2) <i>vari</i> , (3) <i>kārhalā</i> , (4) <i>nāgli</i> and (5) <i>harik</i> after 3 years' rest. Season and tillage both as above. Seed-rate high. Crop 15 annas.
63	60 $\frac{1}{2}$	10 $\frac{1}{2}$	<i>Experiment No. 113.</i> —Rice, <i>Ajga</i> , grown continuously on sandy dark-brown soil lightly manured with 20 baskets per acre of compost of cow-dung and dead leaves. Season fair and tillage on the whole good. Seed-rate very low. Outturn double the maximum of the formulæ. Sample <i>ser</i> weighed 60 $\frac{3}{4}$ <i>tolas</i> in this office.
56 $\frac{1}{8}$ Motalgo. 50 Sarti.	31 Motalgo. 28 $\frac{1}{2}$ Sarti.	3 $\frac{3}{4}$	<i>Experiment No. 114.</i> —Continuous rice on brownish clayey soil manured with 120 baskets per acre of cow-dung. Field irrigated when rain falls from a neighbouring tank. Rain held off for 6 weeks in latter part of monsoon. Cultivation indifferent. Outturn poor. Sample <i>ser</i> weighed in this office about 2 <i>tolas</i> in excess of the reported weight. Both grain and straw valued very high.
59 $\frac{1}{8}$	57	7 $\frac{2}{3}$	<i>Experiment No. 115.</i> —Rice, <i>Sanna Malgi</i> , grown continuously on muddy rice land with sandy sub-soil manured with 24 carts per acre of compost of cow-dung, leaves, husks, ashes and rubbish. The field being at the foot of a forest-clad hill, much fine mould and decayed vegetable matter is carried into it along with rain water. Season and tillage good. Outturn more than double the formulæ standard. Sample <i>ser</i> weighed 2 <i>tolas</i> short of the recorded weight.
184 $\frac{1}{2}$	47 $\frac{1}{3}$	4 $\frac{1}{2}$	<i>Experiment No. 116.</i> —Inferior rice, <i>Vommadlu</i> , on rich brown soil manured with about 20 carts per acre of compost of cow-dung, litter and leaves and growing the same crop every year. Crop irrigated from a small <i>nāla</i> close by. Season fair. Tillage indifferent. Crop 14 annas according to the formulæ.
124 $\frac{1}{4}$	42 $\frac{1}{2}$	9 $\frac{1}{2}$	<i>Experiment No. 117.</i> — <i>Vaingan</i> or hot weather rice on good brown soil enriched by wash from surrounding forest hills and manured with 100 to 150 head-loads of cow-dung and forest litter and growing the same crop year after year, the land being unsuitable for monsoon rice. Crop irrigated from a channel in the neighbourhood, which ran short of water this year owing to deficient late rains. Season average and cultivation fairly good. Seed-rate low.

SPECIAL REPORT

ON

CROP EXPERIMENTS

MADE IN THE

SURAT DISTRICT.

No. $\frac{A}{1466}$ OF 1896.

FROM

E. C. OZANNE, ESQUIRE, I. C. S., M.R.A.C.,
Survey Commissioner, and Director,
Land Records and Agriculture, Bombay ;

TO

J. MONTEATH, ESQUIRE, I. C. S.,
Secretary to Government,
Revenue Department, Bombay.

Poona, 19th May 1896.

SIR,

I have the honour to submit with the following remarks a special report by Mr. C. N. Seddon, I. C. S., on Crop Experiments made in the Surat District by several officers.

2. The special effort which these papers disclose is greatly due to the comments made in my Crop Experiment Report for the year 1893-94, in reviewing which Government (G. R. No. 4723, dated 24th June 1895, Revenue Department) called attention to the necessity of collecting reliable data in the Surat and Broach Districts as to the incidence of the assessment under current rates, in view of the question then, as now, for decision, whether revision settlements should be introduced. I had given an opinion that the experiments then under review indicated a high pitch of assessment in comparison with that of revised districts in Gujarát, and were evidence that the present distribution of the revenue demand was not equal. I thought that even if a net reduction of the assessment in some talukas were to result from the close scrutiny which a revision would necessitate, there was ground for holding that in the interests of the cultivators some redistribution was at least requisite.

3. It is true that after submitting the report referred to, enquiry made proved that some of the crop tests on which this opinion was based were grossly inaccurate, but there remained adequate reasons for the order passed that the Agricultural Department should make the incidence of the present assessment a matter of special study.

4. Later on, as Government Resolution No. 8061 of the 16th October last shows, Mr. Muir-Mackenzie asked for assistance, with the result that Mr. Seddon was transferred from Kaira to Surat. Mr. D'Souza, already an Assistant Collector in Surat, was in addition to his regular duties directed to carry out numerous crop tests under the orders of the Survey Commissioner. Mr. Mollison, Superintendent of Farms, and Mr. Mehta, also an Agricultural Diplomat, holding an appointment in the Survey Department, were directed to assist to the utmost. Some help was also given by Messrs. Fernandez, Fforde and Forbes of the Survey Department. Mr. Mehta made several rapid visits to different talukas in October to select suitable fields for experiment.

Throughout the season the efforts were not relaxed, though it was found possible to entrust Messrs. Seddon and D'Souza with a revenue charge, the crop tests taking precedence of other duties.

5. All the officers concerned have made the utmost of their time and opportunities. The analysis of the numerous tests was so formidable in bulk that Government were pleased on my representation to allow Mr. Seddon to draw it up under my supervision, so that the report may reach Government while the settlement reports of the three talukas, Bárdoli, Olpád, and Chorási, are under deliberation. These reports, except Chorási, have already been submitted as trial settlements to enable Government to decide whether to sanction a regular revision settlement.

6. The reports are confined to Surat. Mr. Muir-Mackenzie's proposition was to confine the work to the three talukas named above, but as two officers instead of one were deputed to the work, it has extended throughout the district. I think that similar effort need not be repeated in Surat, but it is an important matter to decide whether it is not required for Broach.

7. If Government think that the results of the Surat experiments are sufficiently valuable to justify the deputation of an officer to Broach next season, I hope that Mr. Seddon will be selected. He has gained a great deal of knowledge and insight both into the agricultural practices of Surat and into the working of the Survey and Settlement Department. My own opinion is that the repetition of the special effort in Broach next year will be valuable, and will help to prevent too great detail in the Broach revision, but at the same time may bring to light errors made at original survey which might otherwise escape notice in the very partial operations which are at present proposed to be carried out in the Broach District, prior to revising the rates on the expiry of current leases.

8. I now make a few comments on Mr. Seddon's analysis.

BÁRDOLI

9. The revision proposals for this taluka have been submitted provisionally in order that modifications might be recommended if indicated as necessary by the results of the crop experiments.

10. All the tests were taken in villages which are proposed for the first group in Bárdoli and this is satisfactory; for if the rates for that group are suitable, I have no doubt as to those for the other groups. I have closely studied the analysis, and believe that no modification is needed in the Bárdoli proposals. The pitch of both dry crop rate and the rate for water in rice land appear perfectly right as far as the crop tests give indication relevant to the matter. It has been explained in the report on Bárdoli that the real incidence of the water rate in rice land is not so greatly altered as the comparative figures would at first sight appear to necessitate; that is, the old Rs. 10 rate is not in actual working higher than the proposed Rs. 6 rate; for at original survey there was no addition in classification for the facility of growing a second crop after rice. The proposed rate only makes a great difference in (1) tank irrigated rice land and (2) in rice land without moisture for a second crop. (See paragraph 32 of my Bárdoli Report.)

11. The season for *Kada* rice was decidedly bad all over Surat. It was also unfavourable to *vál* following rice. Mr. Seddon has pointed out anomalous cases where the cultivator did not make the best use of his land.

12. The rates at which land is sublet, as disclosed by enquiries made by Mr. Seddon, are very low, so low as to carry the conviction, either that he was misinformed or that there were exceptional circumstances not brought out. In Exp. Nos. 9 and 10 it would seem that the Kanbi is the real owner and that the interloping Girásia has not ventured to assert a claim for a high rental.

13. The Bárdoli proposals deal more with a re-distribution of assessment than an alteration of the pitch, and, as far as Mr. Seddon's experiments show, the re-distribution has been made on right lines. It must not be supposed that the elimination of the Natural Bágáyat classification has invariably lowered the assessment on the lands so classed, or that, on the other hand, the difference between land assessed as Natural Bágáyat at original settlement and as Dry Crop now, is so small as that indicated in the special fields tested by Mr. Seddon. Where the land is really of superior order soil, and has sweet water available at a short depth, the dry crop assessment with the subsoil water charge brings no reduction, and in some cases a small increase; but there are numerous villages where these conditions were not present and where the elimination of the old Bágáyat assessment will cause a very large reduction and a just one. No such case has been tested by Mr. Seddon.

14. All the experiments are interesting, and the information carefully recorded by Mr. Seddon will be useful as an addition to our knowledge of agricultural practices as well as to the elucidation of the incidence of the survey assessment.

15. There is one case on which inquiry will be made, *i.e.*, that of Exp. No. 21. The classification of the soil at 11½ annas is not authorized by the rules. This is the chief reason for what, making allowances for the circumstances noticed by Mr. Seddon, seems still a high assessment. Mr. Seddon thinks that the revision assessment on the field of Exp. No. 26 is too low, as was the old assessment. At original survey apparently a mistake was made in not charging a water rate. At revision the re-classification in Bārdoli did not include a re-classification of Dry Crop land and the field in question has been *confirmed*, the old classification being taken as correct with the addition of the charge for subsoil waters.

16. The parasite referred to in Exp. No. 24 does not attack plants other than those belonging to the Solanaceæ, that is, tobacco, potatoes, &c. The cultivator's allegation that it prevents his growing sugarcane is incorrect.

CHORASI.

17. The revision proposals for Chorasi were received by me before I had studied Mr. Seddon's analysis of crop experiments in that taluka. The Deputy Superintendent, supported by the Collector, does not contemplate any modification of maximum rates.

18. The experiments made in Chorasi were fairly numerous and from a settlement point of view were well selected. The rich garden land on the north and east of Surat and the Bhata land across the river received most attention. But in the garden villages dry crops also were not neglected. South of Surat the land is more or less impregnated with salt, and the water is brackish, facts which are very important in settlement. Garden crops in this locality are very rare and very unimportant, save toddy palms which have naturally not been selected for experiment. Ten experiments were made on *juvár*, sesamum and cotton in the adjoining villages of Althán and Bhatár. In the extreme south of the taluka, which is much intersected by Sachin territory, rice becomes a crop of some importance. Tests were made in six villages by Mr. Mehta, who, however, unfortunately disregarded the standing orders as to the minimum area for test. In an ordinary case I should reject these experiments, but they are the only evidence available in the report as to rice and are included in the analysis for what they are worth.

19. Even the experiments on dry crops in Althán and Magob show the great difference which exists between the two tracts represented by these villages. At present rates even in a year favourable for *juvár* and cotton, the incidence of assessment is high in the salt impregnated black soil south of Surat, while in the light soil villages, of which Magob is a fair representative, the present rates seem decidedly low. To a certain extent this will be remedied in classification; for land has been classed as Natural Bágayat at revision wherever superior order soil has been found in conjunction with easily available sweet water. Cotton seems to do as well in one tract as in the other, but its cultivation is far more extensive in the black soil. The tests on sesamum disclose a high incidence. There is no doubt that sesamum is a good fallow crop, but there is evidence that it pays better to grow continuous *juvár* with pulses.

20. Exp. Nos. 53 to 55 are interesting. In the first, *juvár* is a rotation crop; in the other two it is continuous, though probably now and then it gives place to cotton or sesamum. In Exp. No. 54 the continuous *juvár* with good manure yielded better than in No. 53, but in No. 55, where apparently neither rotation nor manuring is usual, the incidence is naturally very high.

21. The experiments in cotton are very interesting, because this crop is usually beyond the power of ordinary crop experimenters. The liability to boll-worm from the use of factory-ginned seed arises, no doubt, from the inevitable mixture of seed taken from fields previously infected with the worm, with seed from uninfected fields. The cultivator could apparently save himself in large measure by hand-ginning all his seed from clean bolls.

22. It would seem, from the comparison instituted by Mr. Seddon at the end of comments on Exp. No. 61, that there is little difference in the profit of growing cotton and *juvár*, and considerable strength is given to his comment in the Bārdoli analysis, that it is a mistake to suppose that in Surat at least

cotton is the rent-paying crop, save in the sense that it is the crop sold for the rent. The deduction may be drawn from these tests that the maximum rate in the tract represented by Althán should not, as now, be the same as that represented by Magob.

23. I am diffident about making deductions from Mr. Mehta's rice experiments (Nos. 64 to 69), but in no case does the incidence appear excessive, especially when it is considered that in some cases where the land certainly can and usually does grow the second crop, either the second crop has not been tested or has not been grown this year. Mr. Mehta's estimate of the cost of cultivation of rice land is certainly open to the criticism which Mr. Seddon has made.

24. Mr. Mollison and Mr. Seddon have thoroughly studied the high cultivation in garden land in Magob and Kumbhária, and shown how even Surat to a large extent supplies the Bombay market of the crops grown, groundnut, cabbages, potatoes, ginger, turmeric, yams, onions, sugarcane and sweet potatoes. The first three are crops of somewhat comparatively recent introduction. Sugarcane probably does not pay as it used to, though the experiments made indicate that it is still a most profitable crop.

25. The agricultural information incorporated in Mr. Seddon's analysis need not be referred to now, though I by no means underrate its value.

26. The table given at the end of the Chorási analysis shows that, even without alteration of the maximum rates, the assessment on *some classes* of land will be considerably modified partly in the direction of increase and partly in the direction of reduction. Reduction follows in such a case as that of Exp. No. 82, where the whole charge of a large well was placed on a small area at original survey, thus raising the assessment to Rs. 27 per acre. On this field, if the maximum rates are not altered, the assessment as Natural Bágáyat, which the land certainly is, will be less by more than half. Increase will result from the partial classification done wherever the Natural Bágáyat rules have been applied to land formerly classed as Jiráyat. I may explain that these rules simply allow a double charge of the ordinary subsoil water scale wherever the land is found to be of superior order and wherever, at the same time, perfectly sweet water is obtainable at a depth not above 30 feet.

27. This simple modification of the subsoil water rules, to meet the case of such exceptional lands, appears, from the experiments and otherwise, to have given very satisfactory and just results. I may incidentally state in this place that the application of the subsoil water classification, even outside Natural Bágáyat, has effected a re-distribution of assessment, which is clearly right in the Chorási taluka. Thus in the villages north and east of Surat the area assessed is considerable, while in the major portion to the south and west, no charge has been made, even though here and there at original survey wells were assessed.

28. A few comments may be added on particular experiments.

29. In Exp. No. 71 the fertilizing effect of water is probably due to the presence of nitrates rather than of iron. There is no doubt that in Gujarát, for reasons as yet unexplained, some wells contain a very valuable amount of nitrates even though at a distance from the village site or other source where nitrates may be presumed to have been formed. The Agricultural Chemist to the Government of India has tested the water of numerous wells in North Gujarát, and his attention will be drawn to those near Surat. In Katárgaon especially I have personally noticed that wells, to all appearance highly brackish, clearly contain salts, other than common salt, which are decidedly beneficial and not injurious to cultivation.

30. Exp. Nos. 72—74 are on Bháta land in Adájan, a representative village in the trans-Tápti portion of Chorási. In Bháta land the classification is special as also the maximum rate, and the value of the water is included in the ordinary classification. These lands were assessed very highly at original survey. Adjoining them are lands of alluvial formation not now classed as Bháta where the present classification rules of the survey do not appear to meet the conditions found with sufficient accuracy. A long correspondence has taken place on this point. The current lease in these villages does not expire for several years, and I have referred the correspondence to the Deputy Superinten-

dent, in order that he may go over the area concerned with Mr. Mollison and perhaps Mr. Seddon, who will be the Assistant in charge of the táluka.

31. Some departure from the strict letter of the rule seems necessary. As instances, Exp. Nos. 73 and 74 may be quoted. Under the survey rules the soil has been classed as superior order, but no subsoil water assessment has been imposed, on the ground that the water is brackish. But the experiments show that sugarcane is actually grown with this water, and it is a question whether some charge for the water should not be made. It is not probable but possible that the brackishness is not altogether due to the presence of common salt, but of some other salt, in part at least. Mr. Mollison's remarks quoted by Mr. Seddon are to the point. Mr. Seddon has shown how it is impossible to deal with other crops than sugarcane in this area under the Crop Experiment Rules. The cropping is so various and the crop mixture so complicated that none but a resident could take an experiment on all the crops of a field.

32. The high incidence in Exp. No. 75 is not explained. The land is evidently first rate Natural Bágáyat and has been classed almost at the maximum at revision, and there is nothing to show that this valuation is in any way wrong. It must be remembered, however, that groundnut, as Mr. Seddon shows, is a most valuable preparatory crop, both because it is a leguminous plant and because the digging of the groundnuts is in itself equal in value to a considerable expenditure on tillage.

33. The large discrepancy between the estimates of the Formulæ and the facts elicited show that this garden cultivation near Surat was not understood by the framers of the Formulæ.

34. The experiments in Chorási, showing the great variety of cropping and conditions in the neighbourhood of Surat, give ample proof of the wisdom of the selection of Surat as the site for the new experimental farm in preference to Ahmadabad. This reason, indeed, was prominently noticed when the location of the farm at Surat was recommended.

OLPÁD.

35. The experiments made in Olpád were confined to four villages situated in the central zone of the táluka, where cotton and *juvār* are both successfully grown. This is not the most fertile portion of the táluka. At the same time it is decidedly more fertile than the western portion, where continuous wheat is the chief crop. The experiments are on cotton and *juvār*, the staples of the tract represented by the four villages.

36. One experiment (No. 88) in Ambheta was taken in land which is liable from its lie to retain water, which becomes stagnant, for an injuriously long time. In the settlement of Olpád, the question of water-logging is of some importance. Ambheta is outside the area which has been designated by the Deputy Superintendent as the area most liable to injury from water-logging. The experiment adds force to my suggestion in the settlement proposals that Mr. Fernandez' list requires revision. It also shows that temporary remission in land liable to be water-logged should be given for a term of years, even though perhaps in occasional years the injury is not conspicuous.

37. The Olpád proposals have been submitted to Government and the few experiments made do not in any way lead me to modify my recommendations, except *perhaps* on one point. A reference to Appendix Q of the Olpád proposals will show that in three of the four villages concerned, the revision assessment will differ by an inappreciable amount from the present assessment. But in Safetabad, with unaltered maximum rates, there will be an increase of 31 per cent. Safetabad is an uninhabited village. At original survey the distance from village scale was taken from the village or villages where the cultivators resided. At revision survey it is proposed to apply no scale at all. The application of the scale at original survey did not always, as in this case, cause a large decrease in the assessment, so that when the scale is removed the assessment as shown in Appendix Q at revision survey exhibits a considerable enhancement. The question, then, on which the Olpád proposals may *possibly* require some modification is whether, in such villages, the practice at original

survey, or that now proposed at revision, should be followed. I adhere to my proposal that no scale should be applied, for it is hardly possible to go into such minutiae as to consider where the cultivator of each field resides; and, moreover, a field is liable to change hands, and the scale cannot be altered should the field go into the possession of an inhabitant of another village. The utmost that can be done is to give the Collector discretion, if he finds that land in such villages is drifting out of cultivation because the cultivator loses the benefit of the scale deduction, either to induce the cultivators to inhabit the village by providing a village site, or in extreme cases to allow individuals a remission equivalent to the scale deduction. The latter alternative will, however, seldom be a satisfactory one, and I think that uninhabited villages should be left without the scale, unless the cultivators concerned agree to live in the village itself. The formation both of hamlets and village sites in deserted villages, is undoubtedly worthy of encouragement.

38. The incidence of assessment in the Olpád experiments is not excessive. The margin of profit left is considerable and I would in this connection transcribe a paragraph from my Crop Experiment Report for 1892-93:—

“In highly assessed land even a large percentage incidence may leave a full margin of profit to the cultivator. In Exp. Nos. 13 and 14 compared, the balance due to the cultivator in the highly assessed land was only less by Rs. 4 per acre than the balance in the lowly valued land, though the incidence in the former was nearly 26 per cent. and only 8 per cent. in the latter. Undoubtedly a second crop was possible in the former and not likely in the latter. The same comparison may be exemplified from the report by comparing Exp. Nos. 11 and 12 with Nos. 29 and 30. In both these sets the early and late crops were tested. In the former pair the assessment is high, in the latter low. The incidence is 14 per cent. in the former and only 9 per cent. in the latter. The cost of cultivation of the rice and wheat in each of the two fields could not have differed much, but the balance left to the occupant in the former was Rs. 59 per acre while in the latter it was only Rs. 24.

“I think that these remarks fully justify the large incidence noticeable and noticed by Mr. Mollison with sometimes unfavourable comment.”

Details of experiments of 1892 93 referred to above:—

No.	Taluka and Village.	Crop.	Total value of produce.	Assessment excluding Local Funds.	Incidence of assessment on the value of the gross produce.
			Rs. a. p.	Rs. a. p.	
11	Mátar (Mátrapura) ... }	Rice (Kamod) followed by wheat (Kátha).	{ 48 15 7 }	{ 9 9 2 }	14·09
12	Do. (do.) ... }		{ 18 15 4 }	{ O. S. }	
13	Do. (Kamera) ... }	Rice (Kamod) ... }	39 10 11	3 5 4	8·40
				O. S.	
14	Do. (Pansoli) ... }	Do. (Jirásál or Jhini) ... }	42 12 0	10 14 11	25·57
				O. S.	
29	Dohad (Jála) ... }	Do. (Sutarsál) followed by wheat (Vája).	{ 18 4 0 }	{ 2 7 0 }	9·09
30	Do. (do.) ... }		{ 8 8 11 }	{ R. S. }	

39. The high incidence in Exp. No. 88 has been shown to be due to injury from stagnant water. In Exp. No. 84 it may also be noted that the subordinate pulses, if they had been tested, would have reduced the incidence. On the whole, then, the experiments do not show an excessive maximum rate in that particular part of Olpád represented by them. One of the villages, Saroli, is not in the same group as the other villages. This is not because its characteristics are different, but because its position near Rándér is more favourable.

40. The last comment made by Mr. Seddon under Exp. No. 88 is true that the difference in the assessment between good and bad lands is insufficient. This defect has been remedied in the revision classification with respect to sandy and salt lands. As regards water-logged lands also recommendations for remedy have been made. Except in these special cases there is no reason to think that the survey classification was or is at fault.

CHIKHLI.

41. Of the remaining talukas Chikhli is the only one of which I have any personal knowledge. The conditions of Chikhli are peculiar. It is an excellent rice-growing taluka and in places where water is available, either from wells or *dhekudis*, garden cultivation is very remunerative. There are, especially in the north-west, tracts where dry crop is productive and where cotton even grows with success. But the greater part of the dry crop land of Chikhli is either, as Mr. Mehta explains, shallow soil full of stones and lime nodules, or else so stiff a clay that dry crop cultivation is exceedingly unprofitable. Even grass grows very poorly. But such land when converted into rice, yields well. At the original survey this unproductive characteristic of the clayey soils of Chikhli was recognized. The Gujarát survey rules do not allow a fault for stiffness in clayey soil, because such a preponderating proportion of clay is excessively rare in that province. Therefore it became incumbent to recognize the non-productiveness of such soil in the maximum rates.

42. In Chikhli the dry crop maximum was pitched at a much lower figure than the soil rate for rice land. This treatment was exceptional and as far as I know was not needed elsewhere. It was an excellent way of disposing of the difficulty in Chikhli and will no doubt be imitated at revision.

43. In conducting the partial re-classification of Chikhli, considerable doubt has been thrown by chance tests made in dry crop as to the correctness of the old classification in such land. The general fault seems to be that the standard was pitched too high, but so far the evidence does not prove that it was irregular, and I doubt if any wholesale re-classification of the dry crop soils of Chikhli can be shown to be necessary or desirable.

44. The dry crop experiments were made in that part of the taluka where dry crops are more successful as shown by Mr. Mehta; but to compare the incidence with the figures of Olpád, the caution given in my remarks on that taluka as regards the comparative burden of assessment, as indicated by the incidence, in highly and lowly assessed land, must not be neglected.

45. The rice experiments disclose a moderate assessment. They were made on rice grown with the assistance of tank water, except in Exp. No. 122. The remark made as to Exp. No. 120, that the seed-bed was manured with Bombay hemp seed, appears doubtful. This plant is largely used as a green manure, but I have never heard of the seed being used directly as manure. The tanks in Ránkuva and Surkhái (Exp. Nos. 118 and 120) are exceedingly good; but *lang* is grown in the Ránkuva field near the tank because the moisture there is excessive for *vál*. I personally examined the site of this experiment.

46. Three experiments were made in this taluka on sugarcane. The fields selected were evidently of exceedingly fertile description. I saw the field at Pipalgabhán (Exp. No. 128): It has soil eminently suitable for garden cultivation, but irrigation is not available from wells or, at all events, there is no evidence that it is. Under the present rules, it cannot therefore be classed as Natural Bágáyat, but the soil will be classed as superior order soil and a *dhekudiát* charge superadded.

47. In this taluka the classification was not sufficiently advanced to enable Mr. Seddon to show how far the revision classification will modify that made at original survey. Mr. Seddon has made several comments as regards the grouping of the villages. On this point I must enter a caution, that the grouping of Chikhli is very defective.

48. It is noteworthy that in this taluka there is clear evidence that *ráb* is a common practice in the preparation of the seed-bed for rice. In enquiries made some years ago by me on the question of *ráb*, the river Pár south of Chikhli was taken as the northern limit of *ráb*; but the *ráb* cultivation in Chikhli seems inferior, because it is more than once remarked that the seed-bed was extremely foul. This is never the case where *ráb* is thoroughly understood.

49. The Pipalgabhán experiment raises the question of *dhekudiát* assessment. The standing orders regarding this assessment only apply to the northern talukas of Gujarát, and I have recorded in my settlement report on Bórdoli a strong opinion that the conditions of Surat are wholly different from those of

Ahmadabad and Kaira, in that the streams of Chikhli and like talukas, where *dhekudis* are common, have firm banks which are not liable to change, so that the main objection to *dhekudiát*, which caused its abolition in North Gujarát, does not in any way apply to Surat.

50. As to the talukas of Jalálpor, Balsár and Párdi, I refrain from making any comment, because I do not know the talukas personally, though I have visited Párdi, and because I think that the comments would be better made concurrently with the settlement reports when they are submitted, especially as by that time the effect of the revision classification will be known.

51. Mr. Seddon adds a table showing the details of the experiments made in each taluka on each crop. This is valuable if read with the comments in the tabular statement.

52. In his forwarding report Mr. Seddon comments on the inaccuracy of the Formulæ which were prepared for Surat. I think it is clear that the framers of the Formulæ were very insufficiently informed, especially as regards the high cultivation in the neighbourhood of Surat.

53. Mr. Seddon's analysis is a paper of considerable value. He was placed for 6 weeks on special duty for making this analysis and also the analysis of crop experiments outside Surat, as far as they were received up to the date of his return to his ordinary duties. He has manifestly gained a very clear insight not only into the agricultural practices of the Surat District, but also into the technical details of survey and settlement operations. This latter knowledge is possessed by few Civilians under present conditions. Mr. Seddon has shown great energy and discrimination in the conduct of the crop experiments in Surat last season and his analysis is a most creditable piece of work.

I have the honour to be,

Sir,

Your most obedient Servant,

E. C. OZANNE,

Survey Commissioner and Director,
Land Records and Agriculture, Bombay.

FROM

C. N. SEDDON, ESQUIRE, I. C. S.,
Assistant Collector on Special Duty ;

TO

E. C. OZANNE, ESQUIRE, I.C.S., M.R.A.C.,
Survey Commissioner, and Director,
Land Records and Agriculture.

Mahabaleshwar, 14th May 1896.

SIR,

I have the honour to submit a report embodying an analysis of the series of crop experiments carried out in the Surat District during the past agricultural year.

The number of experiments made was 149 and I have added to the tabular statement all the experiments made in former years in the district.

2. Of the total number of experiments made this year, Messrs. Wood, Fernandez, Fforde, Forbes and Pránlál Harkisandás did between them 15, and the rest were carried out by Messrs. D'Souza, Mehta, Mollison and myself. The táluka of Chorási received most attention, 33 tests being taken in it. Of the other tálukas Bárdoli had 29, Jalálpor 21, Olpád 11, Balsár 18, Chikhli 17 and Párdi 20. It was not found necessary or indeed possible to get any work done in Mándvi.

3. I have commented in the analysis itself at length on the various points as they arise in experiments. I shall confine myself here to a few observations which are either of general application or have not been sufficiently emphasised amongst a mass of other matter.

(a) The great variety of the crops grown in the district is worth noting. Surat is, broadly speaking, divided into two parts. In the north, comprising the tálukas of Olpád, Chorási, Mándvi, Bárdoli and Jalálpor, by far the largest area is under drycrop cultivation, principally *juvár* and cotton. In the south, Chikhli, Balsár and Párdi, rice cultivation takes the place of dry crops. In the north the most important question for decision is the proper rates leviable from dry crop lands. In the south the maximum rate for rice is the most important point for consideration. Garden cultivation extends throughout the district, and of all garden crops the most important is sugarcane.

The present experiments indicate that the assessment on dry crops in the north now taken is usually one-fifth of the produce. This seems large, but in the first place the cultivation of dry crops in Surat is neither expensive nor risky; rain seldom fails. And in the second, Gujarát has always paid a high percentage as assessment, and the objections which might apply to introducing high rates do not apply to retaining them. As for sugarcane and other garden crops, my opinion is that the present rates are by no means heavy. Malbári cane produces from 8,000 to 9,000 lbs. of *gol* and the produce is generally worth, even now when *gol* is so much cheaper, over Rs. 400 per acre. Near Surat there is an excellent market for all sorts of vegetables. Quantities are also sent to Bombay, and the present garden rates for the villages south of Surat are, I think, low.

The modifications that the revision survey will introduce into the assessment of rice lands will be very beneficial, particularly where the original survey wrongly classed rice land as Natural Bágáyat.

(b) The inferiority of Olpád to Chorási is well marked. I think there can be no doubt about it, if we except the strip of land on the east of the Olpád táluka. Maximum rates should not be the same in the two tálukas. It is Mr. Mollison's opinion that the natural fertility of black soil lands in Olpád is decreasing, and I fear that this is probably true. Lack of manure is the bane of dry crop cultivation.

(c) Inquiries made disclose a very low general rate of rent. I should, however, feel very loth to base any decided opinions on the facts recorded. In the first place, we have insufficient data, and a certain percentage of the facts stated may be false. It is the evidence of interested persons, cross-examined severely no doubt, but still not absolutely above suspicion. In the second place, the rent charged is no doubt often customary rather than economic. This, the proved value of the crop, occasionally makes quite clear. In the third place, there is a considerable amount of available evidence on the other side. I may instance the high rents paid for grass lands near Surat and the difficulty that has been experienced in obtaining land for the new Government farm. The returns embodied in the various revision survey proposals may also be noted, though confidence is by no means inspired in their accuracy.

4. In my report I have treated at greater length the four northern talukas. This is partly because the experiments there are more numerous and varied and partly because I know these talukas fairly well myself. Chikhli, Balsár and Párdi I have never visited, and my knowledge of them is entirely paper knowledge, if I may use the expression.

5. I have embodied in the report a considerable amount of agricultural information and have included descriptions of the practical cultivation of rice, *juvár*, cotton, sesamum, sugarcane, yams, sweet potatoes, &c. These descriptions are, I know, useless from the purely settlement point of view. At the same time if they are not given in this report they will not be given at all, and the information which Mr. Mollison, Mr. Mehta and myself have after considerable study and inquiry collected will be lost. I venture to think that many of these descriptions are interesting if nothing more.

6 The report contains a great mass of figures and calculations. Every care has been taken to secure accuracy, and I hope that there are no errors of any magnitude. In the experiments the greatest care was taken to make the returns of outturn absolutely trustworthy. I may add that I am responsible for all the opinions and facts given in the footnotes.

7. Before concluding I should like to add that the experiments have demonstrated that the formulæ rates of seed and outturn for Surat are in many cases incorrect. Actual rates for seed and outturn have been given for some important crops in Appendix A. The figures there given are collected from all the experiments done in Surat.

I have the honour to be,

Sir,

Your most obedient Servant,

C. N. SEDDON,

Assistant Collector on Special Duty.

Analysis of Crop Experiments in the Surat District.

In all 149 experiments were during the year carried out in this district. Of these 27 were on *juvár*, 17 on cotton, 38 on rice, 24 on second crops following rice, 18 on sugarcane, 16 on other garden crops and the rest (6) on miscellaneous crops. Fifty-seven tests were done by myself. To the rest Mr. D'Souza contributed 24, Mr. Mollison 25, Mr. Mehta 28, Mr. Wood 3, Mr. Pránlál 7, Mr. Fernandez 2, Mr. Fforde 2 and Mr. Forbes 1.

I now proceed to analyse the experiments in order, *táluka* by *táluka*. Tests taken in previous years (since 1883-84), which have been added to the tabular statement for ready reference, are printed in italics by way of distinction.

BA'RDOLI TA'LUKA.

Twenty-nine experiments were during the season taken by myself—9 on rice, 6 on second crops following rice, 4 on cotton, 3 on *juvár* with subsidiary pulses, and 7 on garden crops. The results are tabulated, and I proceed to deal with the experiments in order.

Experiment No. 1.—This was taken at Goji. Subsidiary to *juvár* (Sorghum vulgare) were *vál* (Dolichos lablab), *tuver* (Cajanus Indicus), *choli* (Dolichos catiang) and *mag* (Phaseolus mungo). The *choli* and *mag* were trifling and not tested. *Vál* yielded fairly; *tuver*, though tested, was not worth it. The chief crop, *juvár*, yielded 870 lbs. grain per acre and the total value of the acre outturn was Rs. 23-9-1. The land was assessed at the rate of Rs. 3-0-6 per acre and the incidence works out to 12-89 per cent., which is low. The seed rates quoted were 15 lbs. *juvár*, 3½ lbs. *vál*, 1 lb. *tuver*, 1 lb. *choli* and ¼ lb. *mag* per acre. The amount of *juvár* sown is undoubtedly exaggerated. Like all *juvár* in this district it was sown with a two-coultered drill (known locally as *phadko*) in July, the ground afterwards being smoothed with a *karab*. The cultivator is a Káliparaj man, a Dubla. The soil is light greyish brown with a considerable admixture of *kankar*; this field once formed the site of a Dubla settlement, and is supposed therefore to be somewhat above the average in fertility. Thirty cart-loads per acre of farm-yard manure are said to have been put on. This may very likely be true. The Dublas in return for their keeping the village cattle trough full are allowed the droppings of the village cattle on the cattle standing ground.

Experiment No. 2.—Another experiment on *juvár* was made at the same village, this time, on a field situated in the poorer part of the village and assessed at a rate of Rs. 2-1-6 per acre and cultivated by a Káliparaj Dubla. Seed rates given me were 16 lbs. *juvár*, 5 lbs. *tuver* and 3½ lbs. *mag* per acre. From inquiries I have made I have no doubt that these figures are wrong and the real rates approximate to the rates usual throughout this part of Surat, viz., 6 to 7 lbs. *juvár*, 3½ lbs. *tuver*, and ½ lb. to 1½ lbs. *mag*. The cultivator told me that he put on 26 cart-loads of manure per acre. I think this statement certainly incorrect, as it is not apparent where the Dubla could get so much manure from, and as the field did not present the appearance of having been manured. The field is a large one—9 acres 13 gunthas. Between 5 and 6 acres are under the mixed *juvár* crop and the rest is what the Taláti calls *padtar*, not waste or fallow but grass. The value of the grass is about Rs. 6 to 7 per acre. It is generally grazed and not cut. This part of the field is low and broken by a *nála* for which no *kharáb* was allowed at original survey but 13 gunthas at revision. The *nála* has probably been lately formed. The higher parts of the field appear to be an admixture of black soil and *murum* with considerable variation in the proportions. I dug holes in several places. There can be no doubt that the soil is poor. I specially selected the field to contrast its outturn with that of the first experiment, and because it is a field very typical of the poorer soils in this part of the Bárdoli *táluka*.

The soil was classed as Jiráyat at 7½ annas for soil, and this classification has not been altered at revision by classification for subsoil water or otherwise.

Experiment No. 3.—This experiment was taken at Aphwa, a *kankari* black soil village near Bárdoli. The cultivator is a Kanbi and the field is a very typical one of its kind. I am induced to think the anna estimate, 12, is low and should be 16, as the crop was probably an average full crop. The seed rates given were the ordinary rates mentioned in the last experiment as the usual ones. Fifteen cart-loads of farm-yard manure per acre are said to have been applied. This may possibly be the case, but it is certainly not customary to manure dry

crop lands every year. Manure is as a rule applied once in two or three years and generally, when *juvâr* and cotton are sown alternately, before the cotton rather than before the *juvâr*. The yield of *tuver* is good. The year was not good for these subsidiary pulses. When the *juvâr* is a success, the *tuver* and *mag* suffer. All three are sown together. The *mag* is ready about 10th December. It is pulled up and left on the field. *Juvâr* is cut about Christmas, and *mag* and *juvâr* are then carted away together. The exact date of the general *juvâr* harvest depends upon the ripening of the earliest fields. If one cultivator cuts, all his neighbours do the same through fear of birds. *Tuver* is left and it may be cut about 10th January or left till later. If cut early, a good many unripe pods are lost, but the land is cleared. If cut later, some early pods burst, but the plants branch out and give a rather heavier yield. My *tuver* was all cut early.

This field was classed at original survey at 14½ annas for soil and no change has been now made.

Prices at Bârdoli were:—*juvâr* Rs. 24, *mag* Rs. 26, *tuver* Rs. 30 and *vâl* Rs. 20 per *ga'li* of 30 Surat maunds of 40 *ser*s, each *ser* weighing 37½ *tolas*. Prices of fodder vary a good deal, but *kadbi* fetches about 8 annas a hundred bundles. Grain weightments are, except in one or two cases where the amounts are quite trifling, of dry grain, the percentage reduction being ascertained by keeping 100 *tolas* of grain.

Experiment No. 4.—Cotton at Aphwa in a field which grows alternately cotton and *juvâr*. It is a field of the same kind as that of the last experiment, *viz.*, black soil. Here too the cultivator is a Kanbi. The cotton yielded 365 lbs. per acre, which is not a very high yield. No manure was applied though it took a considerable amount of cross-examination to force the cultivator to admit the fact. This cultivator gave the seed rate at 21 lbs. per acre, stating that he put 2 maunds of seed on his bit of land which was Pot No. 1 of the field and measured 3 acres 16 gunthas. I imagine that 10 lbs. per acre is nearer the mark. The gross value of the yield was Rs. 31-10-8 and the incidence 11·38 per cent. There were three pickings from test area of 8 gunthas for this crop:—

8th February, 21 *ser*s ; 24th February, 50 *ser*s ; 9th March, just under 5 *ser*s.

Revision survey classes the land as Jirâyat with 13 annas for soil. I show here how this field and that of the last experiment compare.

Field.	Crop of test.	Value of gross produce per acre.	Assessment per acre (original survey).	Percentage incidence of assessment.	Bhâg annas (revision survey).	Assessment per acre (revision survey).
		Rs. a. p.	Rs. a. p.			Rs. a. p.
Survey No. 70 (Exp. No. 3)	... Juvâr, &c....	25 2 6	3 13 6	15·28	Soil 14½	4 8 6
Survey No. 152 (Exp. No. 4)	... Cotton ...	31 10 8	3 9 8	11·38	Soil 13	4 1 0

The revision rates are calculated at a soil maximum of Rs. 5 which is the rate proposed for Aphwa and there are no subsoil annas for either field. It will be noticed that the incidence is in each case reasonable, and there can be no doubt that a successful cotton crop is more valuable than a successful *juvâr* crop. It is usual to say that "cotton is the rent-paying crop." I think this is hardly correct, for it must be remembered that a field of cotton is much more likely to fail than a field of *juvâr*. So much is this the case that owners of a small amount of land often confine themselves entirely to *juvâr*.

Experiment No. 5.—Cotton at Goji. This is a rather better field than the second *juvâr* field (Exp. No. 2), there being less *murum* and more black soil. The field is a somewhat large one of 5 acres 34 gunthas with an assessment of Rs. 14-8 or Rs. 2-7-9 per acre. Of the whole field 4 acres 32 gunthas are under cotton, the rest being inferior grass land. The yield of cotton was, in my opinion, good for the field, 312 lbs. per acre worth Rs. 27-1-4, the incidence of assessment on gross produce being therefore very low, *viz.*, 9·17 per cent. It must, however, be remembered that over an acre is merely grass, while the incidence is that on the cotton area. Even so the assessment is very moderate. The cultivator is a Kanbi and the cultivation good. The anna valuation is 16. Seed rate was not clearly as

certained, but there is no reason to suppose it differed from the usual rate which is 8 to 10 lbs. per acre. An unnecessarily large amount of seed is often sown and the plants thinned out afterwards. It is better to waste a little seed than to find out—too late—that not sufficient plants have come up. No manure was applied to this crop but 20 to 30 cart-loads per acre in May 1894 before sowing *juvár*. The cotton from the test area of 8 gunthas was picked four times :—

25th January, 11 sers 32½ tolas ; 9th February, 23 sers 16 tolas ;

25th February, 24 sers ; 9th March, 5 sers 23½ tolas.

It may be useful to show the three Goji fields together as I showed the Aphwa fields :—

Field.	Crop of test.	Value of gross produce per acre.	Assessment per acre (original survey).	Percentage incidence of asses-ment.	Bhág annas (revision survey).	Assess-ment per acre (revision survey).
		Rs. a. p.	Rs. a. p.			Rs. a.
Survey No. 36 (Exp. No. 1).	Juvár, &c....	23 9 1	3 0 6	12·89	Soil 11½	4 5
Survey No. 71 (Exp. No. 2).	Juvár, &c....	11 14 1	2 1 6	17·62	Do. 7½	2 13
Survey No. 69 (Exp. No. 5).	Cotton ...	27 1 4	2 7 9	9·17	Do. 7½	2 13

proposed maximum rate for Goji for soil is Rs. 6, the old rate Rs. 5-8, the village being raised from group II to group I.

Experiment No. 6—Cotton at Sarbhán. A black soil field under the usual cotton and *juvár* rotation. The owner is an Anavla Bráhma. He lets part of it to a Kanbi who pays Rs. 20 as yearly rent, the owner paying the Government assessment of Rs. 14-4 plus Local Funds. This bit is a subordinate number of the whole and its area is 2 acres 32 gunthas. It appears therefore that the net profit of the owner is only Rs. 4-14. The anna valuation is 16, but, though this may be correct for the field, I think 14 annas would be more correct as compared with neighbouring fields. The soil is black soil, the cultivation fairly good and 12 or 15 cart-loads of manure were put on per acre before the cotton was sown. Seed rate given, 16 or 17 lbs. per acre, is high.

Pickings from the test area of 8 gunthas were made :—

27th January, 5 sers 33 tolas ; 9th February, 19 sers 34½ tolas ;

25th February, 30 sers 28 tolas ; 11th March, 5 sers.

Experiment No. 7.—Another cotton field at Sarbhán not far from the field of the last experiment. The field (Survey No. 358, area 7 acres 11 gunthas, and assessment Rs. 24-8) belongs to a Kanbi who has given it over or let it out to another Kanbi who pays the assessment and nothing else. No manure has ever been applied to this field and so the cultivation can hardly be said to be good. All the manure that this cultivator has he requires for his rice land. The soil of this field is the ordinary *kankari* black soil. It is said to be inferior, but the people admitted that the cause of its inferiority lies in the fact that it never gets any manure. The outturn of cotton, 187 lbs. per acre, is poor. The anna valuation is 14; and the incidence of assessment on value of gross produce is 20·73 per cent. Pickings from 8 gunthas were made :—

27th January, 6 sers 34½ tolas ; 9th February, 7 sers 31 tolas ;

25th February, 18 sers 19 tolas ; 11th March, 5 sers 24 tolas.

Sarbhán is undoubtedly a fine village. It is in group I and it is proposed to retain it there with the same maximum soil rate, *viz.*, Rs. 6. I show these two Sarbhán fields :—

Field.	Crop of test.	Value of gross produce per acre.	Assessment per acre (original survey).	Percentage incidence of assessment.	Bhág annas (revision survey).	Assessment per acre (revision survey).
		Rs. a. p.	Rs. a. p.			Rs. a. p.
Survey No. 349 (Exp. No. 6).	Cotton ...	25 10 0	5 1 5	19.85	Soil 14½ Sub-soil 1½	6 0 0
Survey No. 358 (Exp. No. 7).	Cotton ...	16 4 0	3 5 11	20.73	Soil 9½ Sub-soil 3¼	3 13 6

The rate for unginned cotton was Rs. 80 per *bhár* of 24 Surat maunds until the beginning of March when it dropped to Rs. 77 and then to Rs. 75. I have calculated values at the higher rate of Rs. 80, as almost all the cotton was picked before the end of February.

In each case I have allowed a few *tolas* for the trifling number of bolls which a careful cultivator could manage to get after my last picking. The fields were, however, picked almost absolutely clean.

Cotton is a difficult crop to test, because it has to be guarded between the pickings. For all my cotton experiments here and in Jalálpor I employed watchmen night and day, two men to each field, from the date of my first picking to the date of my last. I paid them *bhatta* at one anna a day each. They were Government servants, that is to say, village Dheds and they were chosen from villages other than the village in which the experiment was being made and they were relieved of all other duty while watching over my fields. The fields were also visited suddenly and without warning by the Mámlatdár and trustworthy Kárkuns. Thus every possible care was taken to prevent the crops being tampered with, and the results may be accepted as absolutely correct.

The next series of experiments are those on rice and rice and a rabi crop. It is usually the custom to sow *vál*, or *val* and castor, after rice.

Experiment No. 8.—This is a rice field on which I was only able to test the rice, because it was followed by sugarcane which does not ripen till next Christmas. It must therefore be remembered that the incidence of assessment on gross value of produce is much higher than it would be had I been able to test the second crop. The field always has one, usually *vál* or *val* and castor. But sugarcane crops are often taken and one crop of the cane corresponds to one of rice and two of *vál*, that is to say, the second crop this year and both crops next year. For example, if sugarcane is planted in November 1895 it will be cut in December 1896 and the next crop will be the rice of the monsoon of 1897. It is a common thing to plant sugarcane in rice lands in this manner provided always of course that there are irrigational facilities. In this case there is a well. I may here mention that when well water is obtained by private agreement for sugarcane, the rate customary is Rs. 5 per Bigha (27 gunthas) per crop. The rice of this experiment is of the variety known as *Kada*. It is an inferior kind, selling in the Bazár (unhusked) at 12 annas a Surat maund. It must not, however, be supposed that these lands will not grow the better varieties of rice. *Kada* is an early rice and it is advantageous to get the sugarcane sown while the ground is still damp.

The yield of rice is poor, 1,470 lbs. grain and 1,580 bundles straw per acre, valued at Rs. 32-9-10. Seed rate was 90 lbs. per acre—about the average I was told, though the formulæ rate is only 30 lbs. per acre. It was sown in a seed-bed early in July and transplanted. One cart-load of farm-yard manure per guntha is said to have been applied. I understood that this was the amount which was usually applied, but Mr. Mollison says “Mr. Seddon has certainly been misinformed as to the quantity of manure used for rice. I am sure that never more than about 30 fair-sized cart-loads are applied per acre except perhaps where sugarcane follows rice in the same year.” This, as I have mentioned, is not uncommonly the case. And a good deal depends on what is meant by a cart-load. A cart-load, *gáli*, of manure in Surat is not a large cart-load.

Generally throughout the district the season for rice was poor and so it was for *vál*. There was not enough rain. It is very important to bear this in mind

when noticing the high incidence of assessment in rice lands. I have come to the conclusion, and I believe Messrs. Mollison and Mehta agree with me, that in the district a 16-anna or average full crop is 3,000 lbs. per acre of unhusked rice worth about Rs. 65 to Rs. 75. When dealing with the Chorási taluka tests, I shall quote some notes of Mr. Mehta on the cultivation of rice in Surat.

The field of this experiment measures 4 acres 12 gunthas, of which 3 acres 33 gunthas is rice land and 19 gunthas Jiráyat assessed at Rs. 55-6 and Rs. 2-2 respectively. The rice portion thus bears an assessment of Rs. 14-7-8 per acre. Of the Rs. 55-6, Rs. 13-2-4 is for tank assistance or *himāyat*. Under the rates proposed for Sarbhán this rice land would bear a reduced assessment of Rs. 13-2 per acre, its classification being soil 10, subsoil $2\frac{1}{2}$, rain water 8, and tank water $4\frac{1}{2}$ annas. The maximum rates for Sarbhán in group I being Rs. 6 for soil and Rs. 6 for water, the old rates being Rs. 6 for soil and Rs. 10 for water.

Experiment Nos. 9 and 10.—These and the six succeeding experiments, which are all on the double crop, are for this and one other reason, I think, particularly valuable. The other reason is that they are under a good tank and suffered little, if at all, from the scanty rainfall. I have particularly studied the land under this tank. The better class of rices, *Kolamb* and *Bangáliu*, are grown and followed by a second crop of either *vál* and castor or wheat. Of these two rabi crops, wheat is far the most productive. But then it is also exhausting to the ground, while *vál* so far from exhausting probably renovates.

The soil of the rice lands under this tank is an admixture of black and light soils. It is more sticky than ordinary black soil. It has also a certain amount of both white and black *kankar*. It is slightly salt, and the salt, though not affecting the rice, is prejudicial to *vál*. The tank irrigates about 80 fields.

The cultivator of land of Exp. Nos. 9 and 10 is a Kanbi. The owners are Girásia Inámdárs who pay a *salámi* or quit rent of only Rs. 6-9 out of a total assessment of Rs. 46. The Kanbi cultivator has always had this field and appears to have a sort of *hakk* over it. They say they pay Rs. 60 as rent. They used to pay less, but have paid Rs. 60 for the last 25 or 30 years—probably since the original survey. Seed rate is said to be 115 lbs. per acre. This is probably exaggerated, though the formulæ rate of 30 lbs. is certainly much below the mark. Sixty cart-loads of manure per acre are said to have been applied—no doubt an exaggeration. The crop was said to be an 8-anna crop with 2,477 lbs. grain per acre, worth, with straw, Rs. 71-8-3. The crop was probably really a 12-anna crop.

The rice was cut in November and *vál* and castor immediately sown. Seed rates for these are given as 85 lbs. and 4 lbs. per acre—the former undoubtedly an exaggeration. No more manure of course was applied. The *vál* and castor were cut on 20th March, the acre outturn being 599 lbs. *vál* and 16 lbs. castor, worth, with byproducts, together Rs. 13-10-3. The total value of the double yield was Rs. 90-2-6 per acre and the acre assessment Rs. 18-8-2, which is very heavy. But, as will be seen from the table given below, it will be reduced according to revision proposals to Rs. 13-5.

Kolamb and *Bangáliu* rice fetch, unhusked, Re. 1 per Surat maund; rice straw 4 annas per 100 bundles; *vál* Rs. 20 per 30 maunds; castor seed Rs. 12-12 per 7 maunds; and *vál* stalks and dried leaves and pods (valuable as fodder) Re. 1 per 3 maunds.

Experiment Nos. 11 and 12.—This field is slightly inferior to the field of the last two experiments and is assessed at a lower rate, Rs. 17-1-5 per acre. It is cultivated by a Kanbi. Its total area is 1 acre 15 gunthas and it is divided into two Pot numbers; area respectively 1 acre 2 gunthas and 13 gunthas. The larger piece belongs to one Lalu Pema and the smaller one to one Kuvarji Govanji. Lalu rents the smaller bit from Kuvarji for Rs. 10 and thus cultivates the whole number. Kuvarji pays the assessment of the 13 gunthas, which is Rs. 5-3. The small Pot number grows *Kolamb* rice and the large one, which is on a slightly higher level, *Kada*. My test for rice was taken in the smaller field. The outturn is poor; 1,381 lbs. grain worth, with byproducts, Rs. 42-12-6 per acre. Twenty-two cart-loads of manure per acre are said to have been put on. Seed rate doubtful. Crop estimated as an 8-anna one.

Vál was sown throughout the field. But the lower field was entirely spoilt by cattle and I tested the upper field, taking my area of 4 gunthas in such a way as to include a portion of the *bándh*. I always endeavoured to allow a reasonable amount for uncultivable strips. It is the only fair way to do, for it is very decidedly unfair to cut 4 gunthas in the centre of a field. The *vál* was fair—said to be a 16-anna crop. I strongly doubt that and should say 12 annas was nearer the mark, for the year was certainly dry. There was no castor with this *vál*. The *vál* was 482 lbs. per acre worth, with byproducts, Rs. 14-5-7 and the total value of the double outturn was Rs. 57-2-1, making the incidence percentage 29·91.

Experiment Nos. 13 and 14.—This field measures 1 acre 15 gunthas and is assessed at Rs. 23-8. There are 5 Pot numbers, 4 held by Hindus and one by a Pársi. I tested the one held by the Pársi. It measures 19 gunthas and is assessed at Rs. 8, or Rs. 16-13-6 per acre, which is almost exactly the same as that of the Pot number of the last experiment in which I took the rice. That was assessed at Rs. 16-14-9 per acre, being thus less highly assessed than the rest of the field, the average assessment on the whole field coming as I have said to Rs. 17-1-5. The rice crop here yielded 2,457 lbs. grain per acre. It is a variety known as *Bangáliu Saliu* very similar to and priced the same as *Kolamb*. The seed rate given me was 4 maunds for 19 gunthas which must certainly be a great exaggeration. So must the manure rate in all probability, 50 cart-loads per acre. The crop is said to be a 10-anna one, which is, in my opinion, a low estimate. The value of the gross outturn for rice was Rs. 73-4-3.

The field does not always grow a second crop, it appears. It probably always can. This year the second crop was *vál*. It was not a good crop. The anna estimate, 16, is certainly very high. Only 274 lbs. *vál* per acre were obtained valued, with byproducts, at Rs. 8-14-8. The gross value of the two crops was Rs. 82-2-11, and the percentage of incidence 20·49, which is very moderate indeed considering that the crops were under average.

Experiment Nos. 15 and 16.—The second crop here was wheat. The whole survey number measured* 2 acres 5 gunthas and was assessed at Rs. 38-8. It is composed of 3 Pot numbers. Pot No. 3 measured 1 acre 19 gunthas and is assessed at Rs. 26-12 or Rs. 18-2-2 per acre, which is a high rate—reduced under revision settlement proposals. This Pot No. 3 is divided into three *kiáris* or rice fields. Two of these grow *Kada* and one *Kolamb* rice. I tested the one which grows *Kolamb* rice. I took the whole field which measured just under 20 gunthas. It is owned and cultivated by a Kanbi. It is said to have been manured at the rate of 40 cart-loads per acre; and 95 lbs. of seed were used per acre. The outturn, estimated as a 12-anna crop, probably correctly, was 2,517 lbs. grain per acre worth, with straw, Rs. 71-3-5.

After the rice was harvested, the land was harrowed with the *karab* and wheat was sown with a one-coultered drill known as *páli*. No fresh manure was, of course, applied. The seed rate was said to be 80 lbs. per acre, which is high, and less was, I imagine, really applied. The wheat crop was cut in March. The season was somewhat too dry and the crop was only estimated as a 10-anna crop. It came to 927 lbs. grain per acre worth, with byproducts, Rs. 43-2. The grain is valued at Rs. 52-8 per *gáli* of 30 maunds which was the price ruling at Sarbhán. The straw of this wheat, as of most Surat wheat, is very low. When the grain is threshed, the roots and the lower parts of the straw are cut off and thrown away to keep the grain clean, and the upper part of the straw and chaff, &c., are used as inferior fodder, being usually mixed with *vál* leaves when given to cattle. Wheat was sown in all the three *kiáris* of this Pot number, but in one of them it was spoilt by stray cattle. The total value of the yield was Rs. 114-5-5 and the incidence 15·86 per cent., which is low.

I here give a table showing the particulars shown for the dry crops above. Sarbhán is, as I have said, a village of group I, old maximum rates being soil Rs. 6 and water Rs. 10 and proposed new maximum rates Rs. 6 for soil and Rs. 6 for water:—

* Its area is reduced by revision survey owing to the transfer of a strip of 8 gunthas to an adjoining number.

Field.	Crop of test.	Value of gross produce per acre.	Assessment per acre (original survey).	Percentage incidence of assessment.	Bhāg annas (revision survey).	Assessment per acre (revision survey).
		Rs. a. p.	Rs. a. p.			Rs. a.
Survey No. 299 (Exp. Nos. 9 and 10).	Rice followed by Vāl and Castor.	90 2 6	18 8 2	20.53	Soil... .. 9 Subsoil ... 2 Rain water... 7½ Tank water... 8	13 5
Survey No. 302 (Exp. Nos. 11 and 12).	Rice followed by Vāl.	57 2 1	17 1 5	29.91	Soil* ... 10 Subsoil ... 2½ Rain water... 8 Tank water . 8	14 7
Survey No. 300 (Exp. Nos. 13 and 14).	Rice followed by Vāl.	82 2 11	16 13 6	20.49	Soil† ... 9 Subsoil ... 2 Rain water... 8 Tank water . 8	13 8
Survey No. 226 (Exp. Nos. 15 and 16).	Rice followed by Wheat.	114 5 5	18 2 2	16.86	Soil... .. 9 Subsoil ... 2 Rain water... 10 Tank water . 7	13 14

Experiment Nos. 17 and 18.—These were experiments at Bārdoli on land which, for some unexplained and perhaps inexplicable reason, was classed at the original survey as Natural Bāgāyat or Bhāta Bāgāyat. I shall have more to say about this classification of some of the Bārdoli soils when dealing with the garden land tests. Suffice it to say here that the land is ordinary rice land and has been re-classed as such. The cultivator is a Borāh. The yield of rice is miserably low, 786 lbs. grain per acre, valued, with straw, at Rs. 22-4-6. The variety is *Salu*. The season was too dry. The anna estimate given as 8 is high. Fifteen cart-loads of manure per acre were put on at 8 annas a cart-load in Bārdoli. Seed rate 85 lbs. per acre.

The *vāl* outturn was slightly better, but the Patel stated that its valuation was only 5 annas. It amounted to 430 lbs. pulse per acre worth, with by-products, Rs. 11-3-2; total value of outturn Rs. 33-7-8 and incidence 37.33 per cent.

By revision survey the land is classed at soil 10, subsoil 2, and rain water 8 annas. Maximum rates Rs. 6 for soil and Rs. 6 for water. This field would therefore bear an assessment of Rs. 11-4 per acre in place of the present rate of Rs. 12-8 which it bears as Natural Bāgāyat. As the maximum rate for Natural Bāgāyat in Bārdoli was Rs. 11-8, it may be noted that this land appears to have been classed above 16 annas.

Experiment Nos. 19 and 20.—This is a very typical black soil field. It is cultivated by a Kanbi. The rice outturn was poor, 1,119 lbs. valued, with straw, at Rs. 31-0-6. The variety is known as *Jhinu Salu*; it is slightly inferior to *Kolamb*, and priced at 15 annas the Surat maund. Seed rate was 73 lbs. per acre; and manure is said to have been 43 cart-loads per acre. The crop is not a 16-anna crop though the cultivator assured me it was. I should say 8 annas or even less. The amount of empty husks appeared very large and I was told that this is often the case with this variety of rice.

The second crop was *vāl* and castor; 466 lbs. pulse and 106 lbs. oil seed per acre, called wrongly again, I think, 16-anna crop. The seed rate was 45 lbs. *vāl* per acre and the castor rate was quoted at 20 lbs. which is far above the ordinary rate for castor. The field is assessed at Rs. 12-6-11 per acre and the percentage incidence for the double crop comes to 24.66, which is very moderate for a bad year.

* Classification for the Pot number growing *Kolamb* rice tested by me.

† Classification of the Pot number tested by me.

The assessment it will be noticed is low. The field itself measures 1 acre 23 gunthas and the total assessment comes to Rs. 19-8-0. Of this, Rs. 5-8-3 is for tank assistance. Besides that there is a *kasar* for a well which is in the field of Rs. 3-11-0. The well is not used for rice, nor indeed in this field at all, but in an adjoining one.

One further remark may be made. The tank from which this field gets its water is in survey number 61. It irrigates six fields (survey numbers) and brings Government in a revenue of Rs. 21-15-5 per annum. Besides that it is cultivated after the rains are over and is held by registered occupants who pay a total assessment of Rs. 39 for it, its area being 8 acres 22 gunthas. This is one of the class of cases noted in the reports of 1889-90 and 1890-91 when the late Mr. Syad Nuruddinkhán performed some experiments in these tank numbers.

The field is classed at revision survey except a few gunthas which are Jiráyat at soil $9\frac{1}{2}$, subsoil 2 and rain water 8 annas (no tank water). Aphwa is to be of Group II at Rs. 5-8 for soil and Rs. 5 for water. So that this rice land would bear an assessment of Rs. 9-11-6 per acre, with no charge for the well.

Experiment No. 21.—This experiment is unsatisfactory. The yield of rice per acre is even less than in Exp. No. 17 and there was no second crop. The field is an ordinary rice field. It was classed as in that case as Natural Bágáyat with an acre assessment of Rs. 17-4-8. Part of this appears to be a water* rate, but the details of the classification and amount of the water rate are not available.

The land has now been classed as 3 acres 25 gunthas rice, 2 gunthas kharáb, 8 gunthas Jiráyat; and the rice classification is soil $11\frac{1}{2}$, subsoil 2, rain water 8, and tank water $5\frac{1}{2}$ annas or Rs. 14-7 per acre on maximum rates of Rs. 6 for soil and Rs. 6 for water, Puni being in Group I.

I do not think that much can be made out of this experiment, because (1) the rice season was bad here, and (2) there was no second crop though there is one every year as a rule. *Val* was sown but not till a month after the proper time and it came to nothing, and it appears that this was due to the cultivator, a Pársi, having delayed to sow owing to private reasons,—his own marriage. The soil is black soil; seed rate 96 lbs. per acre; manure 45 cart-loads per acre according to the cultivator's statement, which, however, is in all probability an exaggeration.

Experiment No. 22.—In this experiment also there was no second crop. The field is a small one—24 gunthas assessed at Rs. 5-8 or Rs. 9-2-8 per acre. It is close to the village site. The cultivators are the village Dheds, and the land is free Inám, no *salámi* being levied. The cultivation was fairly good. Manure, said to cost 12 annas a cart-load, was applied at the rate of 40 cart-loads per acre according to the cultivator's statement. Seed rate was 96 lbs. per acre. Gross outturn of grain, 1,460 lbs., worth, with straw, Rs. 32-13-6 per acre. Variety *Kada*. The percentage incidence is 27·91, which is low for a single crop in an unfavourable year.

Revision survey classification, soil 9 and rain water 7 annas or, at maximum rates of Rs. 5-8 for soil and Rs. 5 for water, Rs. 8-6 per acre.

Both *vál* and wheat are grown as a second crop in the field, though there is nothing this year. The soil was drier no doubt than usual. Possibly also the owners who have other work to do, could not find time for the second crop. But there is no doubt that the field will and does grow a second crop as a rule.

It is much to be regretted that the past season was so abnormal. It is unfortunate, too, that the Bárdoli táluka has been left severely alone in past years by experimenters, so that there is very little check on the figures given by my experiments this year. Two things, however, are, I think, shown. One is that rates, even as they are, are not too high. The other is that the revision survey proposals will entail a general reduction in the assessments on rice lands. The reduction will be found both in the case of lands originally classed as rice and in those originally classed as Natural Bágáyat.

I now turn to the garden lands. All my experiments have been taken in the Bárdoli Kasba itself and I am afraid that taken by themselves they do not

*There ought not to be a special water rate for Natural Bágáyat. But from an entry in the *Kayam Kharda* there appears to be. One other such case is noticed in Jalálpor.

afford sufficiently reliable data for any very positive deductions. Almost all Bárdoli garden cultivators belong to a caste known as Káchias. They are fairly skilful cultivators, but are almost invariably in debt.

Experiment No. 23.—This and the following are a couple of experiments on the small round reddish potatoes grown in the district. The field measures 3 acres 16 gunthas plus 9 gunthas *kharáb* for a well and is assessed at Rs. 27 or Rs. 7-15-1 per acre. It is Natural Bágáyat. The potatoes were planted in November and irrigated from a well in the field. Like nearly all the wells in Bárdoli, this well was only built up on top and for about 8 feet down. The seed rate was 600 lbs. per acre and about 25 cart-loads of farm-yard manure were put on before sowing and 1,500 lbs. castor cake as a top dressing after the first weeding per acre. The acre outturn was 3,436 lbs. valued at Rs. 111-10-6. This is nothing like the outturn which is got in the Kumbhária group of garden villages in the Chorási taluka near Surat, where Mr. Mollison got 7,513 lbs. in 1894. The soil was light brown *gorát* soil; well water sweet and near the surface. The plot which grew potatoes grew *suran* (*Amorphophallus campanulatus*) last year, before that ginger and before that some dry crop.

The re-classification of this field is soil 22 and subsoil 4 annas.

Experiment No. 24.—Another potato test. The field measures 1 acre 33 gunthas plus 6 gunthas well *kharáb*, assessed at Rs. 15-8 or Rs. 8-7-11 per acre and classed as Natural Bágáyat at the original survey. The soil is the same as in the last experiment and the cultivation as in that experiment is good. Fifty* cart-loads of manure were said to have been put on and 1,500 lbs. of castor cake as a top dressing. Seed rate was 600 lbs. The price of manure is 8 annas a cart-load in Bárdoli and of castor cake Rs. 7 per *khandi* (= 20 maunds = 780 lbs. about). Seed is sometimes stored and sometimes got from Jalálpor or Gáikwádi villages near Navsari. It is undoubtedly, when it has to be bought, a heavy item on the expenditure side, but the price varies immensely. Last year this piece of land had sweet potatoes and the year before *juvár*. The cultivator said his well was not enough for the whole field. I can hardly see why another should not in that case be dug. They cannot cost more than Rs. 100 each. They last very well and would last far better if the people would only keep the *Pipal* and Baniyan tree plants out of the upper masonry.

The field of this experiment is said not to grow sugarcane because of the parasitic weed known here as *agio*, the extirpation of which is practically impossible. Mr. Mollison tells me that the weed is very common among tobacco crops in Kaira, but that constant and careful removal prevents its doing much harm. Such removal is impossible with a dense growth like sugarcane.

The field of this experiment is classed the same as that of the last under revision survey.

Experiment No. 25.—This and the next one are experiments on the curious and interesting vegetable known as *Sakar-kand*, *Sakaria*, *Ratálu* or sweet potatoes (*Convolvulus batata*). *Sakar-kand* is of course the same word as our sugarcandy, both being taken from the Persian شکر قند. The term *ratálu* (red root) is not in Gujarát applied to this plant, but to the large yam (see page 101 of the Manual of Revenue Accounts). Both the crops I tested are said to be 8-anna crops, because a 16-anna outturn is reckoned at half a maund per *kiári* (irrigation bed) (i.e., 10,000 lbs. per acre). There were $13\frac{1}{2}$ *kiáris* in one guntha and 13 in the other.

The crop must, it appears to me, give an excellent return. There is no expenditure for seed, a very heavy item in the case of most garden crops; and the acre outturn even of this 8-anna crop is more than that of the potatoes. The crop is dug up in February. Small fibrous roots remain in the ground, and in June there is a slight re-growth of the plant from these roots. These plants are pulled up and replanted in a seed-bed which has been manured with castor-cake. In that bed during the monsoon they grow large and strong. In October, pieces of the stem or upper growth about a foot in length are broken off and planted in the permanent bed in such a way that both ends are above the soil and the middle beneath it layered in fact. The free ends throw out leaves and runners, and the buried middle throws out roots which are ready to be dug up again in February. Such is the year's history.

* Very likely a slight exaggeration.

The field measures 4 acres 8 gunthas plus 4 gunthas well *kharáb* and is assessed at Rs. 33, or Rs. 7-13-9 per acre, as Natural Bágáyat. The rotation is undefined; the cultivation good; the outturn 4,904 lbs. of fresh vegetable per acre. The manure rate given, 50 cart-loads of farm-yard manure per acre, and 400 lbs. castor-oil cake for seed-bed enough to plant one acre, is probably exaggerated. Of the whole field $7\frac{1}{2}$ gunthas are under *sakaria* and the rest under various other garden crops and fruit trees.

It has been re-classed at soil 17 and subsoil 3 annas.

Experiment No. 26.—Twenty-one and half gunthas are under *sakaria*, the rest being under various other garden crops and fruit trees. The manure rate given was the same as in the last experiment except that only 240 lbs. of castor cake were used for the seed-bed.

The land was classed as Jiráyat under the original survey. I do not understand why. It appears to be exactly the same land as that of the last three experiments. Its well has existed for more than 30 years. Its re-classification is soil $10\frac{1}{2}$ and subsoil $1\frac{1}{2}$ annas. The original Bhág annas were $10\frac{1}{2}$ with nothing for water.

Experiment No. 27.—An experiment on the mixed crop of ginger, turmeric, yams and chillies. The field is 6 acres 3 gunthas plus 5 gunthas well *kharáb*. It was classed as Natural Bágáyat. It is irrigated by an old one *kos* (bag) well. The soil is brown loamy, *pándhri gorádu*, and the cultivator a Káchia. The seed rates given were 1,400 lbs. ginger, 1,120 lbs. turmeric and 840 lbs. yams sown in May and a small amount of chillies sown in July. The manure rate was given as 70 cart-loads of farm-yard manure per acre. After manuring the land it is divided into beds, or *kiáris* as they are styled, for irrigation purposes. There are about 15 *kiáris* per guntha and in each *kiári* $2\frac{1}{2}$ *sers* (of Surat) of ginger, 2 *sers* turmeric and $1\frac{1}{2}$ *ser* yams are planted.

Pieces of ginger, about $2\frac{1}{2}$ to 3 inches long, are put in about 8 inches from each other. In this way the middle of the bed is filled up. Along the sides turmeric is planted; in a similar manner and at each corner yams. Then about July or August the chillies are planted out after having been raised in a seed-bed. They are planted wherever a convenient space appears between the ginger plants. I chose this plot for two reasons: (1) because there were few chillies in it, and (2) because the repetition of such plots constitutes the whole of such plantations.

Last year this bit of ground produced potatoes, before that *suran* (*Amorphophallus campanulatus*), before that it was fallow. This year *san* (*Crotolaria juncea*) is to be sown and when grown, say a couple of feet high, it will be dug in as green manure. Then next June *suran* or ginger will be planted. The seed rates are high as compared with the formulæ. There are, however, no previous experiments on these plants to serve as a check. The outturn is poor, 3,377 lbs. ginger, 2,564 lbs. turmeric, 1,880 lbs. yams and 102 lbs. chillies per acre. The plants, at any rate ginger and turmeric, were not particularly well grown and I have seen both at Bárdoli and elsewhere plants very superior to these.

Experiment No. 28.—This is a similar experiment to the last except that yams and chillies were not tested. The survey number measures 5 acres 27 gunthas plus 3 gunthas well *kharáb* and is assessed as Natural Bágáyat at Rs. 55 or Rs. 9-11-1 per acre. The manure rate was 30 cart-loads per acre, probably a correct statement. The seed rate was 1,700 lbs. ginger, 340 lbs. turmeric and 480 lbs. yams. The outturn was 8,337 lbs. ginger and 2,564 lbs. turmeric per acre worth Rs. 150-0-4 and the incidence of assessment 6·46 per cent. The cultivator as usual is a Káchia. In my bit measuring $1\frac{5}{16}$ guntha there were 5 yam plants and 66 small and stunted chillies which I did not test because they were not ready. Their produce would be but small. The crop was estimated as a 14-anna crop; the soil was the Bárdoli brown soil and the cultivation good.

The history of this field is interesting. The original owner thirty years ago was a Káchia by name Harji Hansji. He got involved with a Márwádi, Khushál Dungarji, and was obliged to give up the field. Khushál Márwádi became owner and Khátedár in August 1872 and the field passed to a partner of his, one Bhaisa Márwádi, by partition. In May 1874 one Dulabh Mahwa, a Káchia (no connection with Harji), bought the field from Bhaisa and got his name entered as Khátedár. To get money for this, he borrowed from another Márwádi, Dhupa Khetji, and as security mortgaged the field to Dhupa. Dhupa then got the Káchia so involved that he was obliged to give all his rights

over the field to him (Dhupa) and Dhupa's name was entered and after him his son Premchand Dhupa became Khátedár, and now lets this field and another for Rs. 200 per annum to Dhulabh Káchia's son.

Experiment No. 29.—The only experiment on sugarcane which I was able to get in Bárdoli. It is a dark variety known as *Rati* or *Kali Sherdi*. The field is one similar in all respects to the others treated of above. It measures 5 acres 28 gunthas plus 2 gunthas *kharáb* and is assessed, as Natural Bágáyat, at Rs. 51. I tested a piece in Pot No. 1 which measures 3 acres 10 gunthas and is assessed at Rs. 29.2 or Rs. 8.15-5 per acre. The Pot number belongs to and is cultivated by a Káchia.

The variety is a fine large cane of a deep red or reddish purple colour used for *gol* and also sold fresh as fruit. This particular crop was all cut and sold for eating purposes in the Bárdoli Bazár. It is cut as required and sold by the female members of the cultivator's family. It is fair to assume that the cultivator knows what pays best, and finds that while there is a good demand for fresh fruit it is better to sell the cane thus than to turn it into *gol*. It is always a surprise to me what a large quantity of fresh sugarcane can be disposed of as fruit in a small market. I am told that neither Malabári cane for juice nor Surti Meva for fruit do well in Bárdoli.

The cane was planted in March, after the ground had been manured at the rate of 60 cart-loads per acre. The outturn, which is called a 16-anna crop, was 28,800 canes per acre valued at Rs. 240, bringing the incidence percentage to 3.73. The crop was free from disease but damaged a little by jackals and beaten down by the rains of last October. 11,000 bits of cane were put in as seed.

I cut one guntha. From that there were 720 canes. Here they are not divided into classes, as are the Surti Meva sold in the Surat Bazár. The cultivator counts the canes in the following way. The canes are counted two by two. If each cane measures about 5 *hátls*, two such canes are counted as two. If they measure a little less, a small cane is thrown in, and the three canes are still counted as two. If they are a good deal short, two small canes are thrown in, and the four counted as two. The unit in fact is "5 *hátls* of cane." According to this counting my 720 canes became 500; and the cultivator got 1,000 canes for seed at Rs. 12 with which he planted about half an acre.

The canes are sold retail at from $\frac{1}{2}$ pie to 1 pice each. The cultivator admitted the value of the lot, one guntha's produce, at Rs. 6 and I think this is about right. The Mamlatdár reports Re. 1.4 per hundred which would bring the price over Rs. 9. It must be remembered that the cutting and selling of the canes entails a good deal of labour. This is, however, all home labour, the canes being sold, as I have mentioned above, by the women of the family in the Bazár.

I add here a table showing incidence and rates as before. Maximum soil rate is Rs. 6:—

Field.	Crop of test.	Value of gross produce per acre.	Assessment per acre (original survey).	Percentage incidence of assessment.	Bhág annas (revision survey).	Assessment per acre (revision survey).
		Rs. a. p.	Rs. a. p.			Rs. a. p.
Survey No. 257 (Exp. No. 23).	Potatoes ...	111 10 6	7 15 1	7.11	{ Soil 22 Subsoil 4 ... }	9 12 0
Survey No. 269 (Exp. No. 24).	Potatoes ...	104 11 0	8 7 11	8.11	{ Soil 22 Subsoil 4 ... }	9 12 0
Survey No. 190 (Exp. No. 25).	Sweet potatoes .	130 0 0	7 13 9	6.04	{ Soil 17 Subsoil 3 ... }	7 8 0
Survey No. 204 (Exp. No. 26).	Sweet potatoes .	112 8 0	3 6 4	3.02	{ Soil 10½ Subsoil 1½ ... }	4 8 0
Survey No. 195 (Exp. No. 27).	Ginger, &c. ...	88 10 8	9 11 5	10.96	{ Soil 20 Subsoil 4 ... }	9 0 0
Survey No. 194 (Exp. No. 28).	Ginger, &c. ...	150 0 4	9 11 1	6.46	{ Soil 22½ Subsoil 4 ... }	9 15 0
Survey No. 239 (Exp. No. 29).	Sugarcane ...	240 0 0	8 15 5	3.73	{ Soil 21 Subsoil 4 ... }	9 6 0

The facts ascertained indicate that Survey Number 204 was under-assessed and that the under-assessment is to be continued. I may here point out that my revised rates are all calculated without the modifications which the application of the distance from village site scale will entail. In some cases the assessment will be slightly above and in some cases slightly below the rates I have given. It is impossible for me without knowing the distance scale to say how much in each case. But the theory of the scale is of course that while some fields are raised and some are lowered, the gross assessment is unaltered. In my opinion the general results of the garden crop experiments as well as my own personal observations indicate that the garden lands here cannot compare either with the Chorási garden lands near Surat at Kumbhária, Magob, and one or two other villages or with the better villages of the Jalálpur taluka. And it is only the general results like these which can be expected, inasmuch as the land assessment plays a very insignificant part in the expense of raising such a crop as sugarcane in comparison with such items as cost of manure, labour for irrigation, price of seed, &c.

JALÁLPOR TALUKA.

There were seven tests on *juvár* and *juvár* with subordinate pulses taken this year, four by myself and three by Mr. Wood. There were four tests taken by myself on cotton. The year was a fair average year for both these crops and the cotton and *juvár* tests taken together indicate very well, I think, what the burden of the assessment really is. It is important to remember that the cotton and *juvár* rotation is the common cropping here.

I am unable to give here, as in the case of Bárdoli, the revision survey rates and classification, because the classification has not yet been done. The only thing that can be done is to show clearly how the present rates fall. The original Bhág annas are often not yet deduced.

Experiment No. 30.—A dry crop field assessed at the high rate of Rs. 6-4-3 per acre. The soil here and throughout this part of the taluka is black soil with some admixture of *kankar*. It was classed at 16 annas at the original survey. It was unmanured this year, but about 20 cart-loads of manure are put on every two or three years. The cultivator is an Anavla Bráhmaṇ. The *juvár* plants were tall and the heads fairly large, but the space between the plants somewhat great. For this reason the crop is held only to have been a 14-anna crop. The outturn was 793 lbs. *juvár*, 72 lbs. *tuver* and $2\frac{1}{2}$ lbs. *mag* valued, with byproducts, at Rs. 24-14-8. The variety of *juvár* is known as *Chapti juvár*. It is priced at Rs. 27-8-0 in the Navsari Bazár per *gáli* of 30 Surat maunds, while the commoner variety *Pirio juvár* fetches only Rs. 27. *Chapti* is white, *Pirio* yellow. The seed rates were $9\frac{1}{2}$ lbs. *juvár*, $1\frac{1}{2}$ lbs. *tuver*, and $\frac{1}{2}$ lb. *mag* and a handful of *choli* and *math* (*Phaseolus aconitifolius*) which came to nothing. It will be seen that *mag* also was a mere trifle and *tuver* very little. The incidence of assessment works out to 25·14 per cent.

Experiment No. 31.—The same crop on similar land at the village of Eru assessed at Rs. 4-5-5 per acre and classed at original survey at $15\frac{1}{2}$ annas. It is cultivated by an Anavla Bráhmaṇ who says he sold the whole crop, a month before it was ready, to a Kumbhár for Rs. 69, the field, all of which is under *juvár*, measuring 5 acres 26 gunthas and assessed at Rs. 24-8. The crop is put down as a 16-anna crop, and there were great stretches of *juvár* at least on this side of the taluka of much the same appearance as this field. The rotation is the ordinary cotton and *juvár*.

The field was unmanured this year, but manure, whatever is available, is applied every three years. The outturn of grain was 865 lbs. *juvár*, 43 lbs. *tuver* and 29 lbs. *mag* valued, with byproducts, at Rs. 25-2-1 and the incidence works out to the moderate figure of 17·26 per cent.

Experiment No. 32.—The field chosen was a poor one, but there was a good deal of such *juvár* round about Hansápor, where the soil struck me as inferior. The cultivator is a Koli. He stated that 20 cart-loads of manure per acre were put on before sowing. My own very decided opinion is that this was untrue. The field did not look as if it was manured and I do not believe it was. The crop

suffered a little from the scanty rainfall, the soil appearing to be more thirsty than the Vijalpor or Eru land. The crop was estimated as a 12-anna one. The rotation is cotton and *juvār* and the assessment Rs. 3-5-1 per acre. Gross outturn was *juvār* 453 lbs., *tuver* 10 lbs., and *mag* 24 lbs. per acre, valued, with by-products, at Rs. 13-11-4; and the incidence of assessment works out to 24·20 per cent. The seed rate given was 14 lbs. *juvār*, 2 lbs. *tuver*, and 2 lbs. *mag* per acre; 8 lbs. *juvār* would probably be nearer the mark.

The soil was classed at 14 annas, which appears to me to be high. In this field there are six shares—three supposed to be good and three inferior. I could detect no difference in the crop. But I may add that my 8 gunthas were in one of the supposed inferior bits.

Experiment No. 33.—This is a 14-anna crop at Jalálpor. Soil the same as at Vijalpor and Eru; no manure this year but 20 to 30 cart-loads per acre before last year's cotton; rotation cotton and *juvār*; owner an Anavla Bráhmaṇ; cultivator a Koli, who pays a rent of Rs. 81 for 3 acres 12 gunthas of this *juvār* land and 3 acres under cotton in another field, the owner paying the assessment of about Rs. 24. The whole field measures 6 acres 23 gunthas and is assessed at Rs. 23. It is divided into two almost equal Pot numbers, each assessed at Rs. 11-8. Pot No. I is 3 acres 12 gunthas assessed at a rate of Rs. 3-7-9 per acre and classed at 14½ annas as Jiráyat land. The other Pot No. is under grass.

The acre yield was 846 lbs. *juvār*, 9 lbs. *tuver* and 7½ lbs. *mag* valued, with by-products, at Rs. 22-12-9. The incidence of assessment thus works out to 15·28 per cent., which is very low considering that this is a 14-anna crop and the next year's crop will be cotton. Seed rates were given as 14 lbs. *juvār*, 1½ lb. *tuver*, ½ lb. *mag* and ½ lb. *choli* per acre; 8 lbs. of *juvār* is enough, and if more be sown the plants have to be thinned out afterwards.

Mr. A. Wood, Assistant Collector, submits three tests taken at Vijalpor, Bodáli and Sisodra on *juvār* in this *táluka*. He intended to select one field of black soil, one of *gorát* and one of *besar*, but had no time to do so. In the body of the report, Mr. Wood calls all the fields *káli besar* and observes in the remarks "the Patels and cultivators insisted on using this term, but that it was the right one only for the Vijalpor field. The Sisodra field was certainly black soil, but not of a good quality, containing grains of *kankar*. The Bodáli field was called by the Mámlatdár *gorát*, but I should call it *gorádu besar*, but it was not greatly different from that in Vijalpor." My own experience of the *táluka* is that nearly all the dry crop soil is black soil, but the amount of *kankar* in it varies.

Experiment No. 34.—The field at Vijalpor measures 4 acres 19 gunthas and is assessed at Rs. 28 or Rs. 6-4-1 per acre, so that it is very similar to that of Exp. No. 30. The rotation is cotton and *juvār*. The cultivation is described as good. No manure was applied. The seed rate is given as 11½ lbs. and the outturn of the *juvār* as 975 lbs. of grain valued, with byproducts, at Rs. 23-15-6. The incidence works out to 26·09 per cent. Subordinate pulses were not tested and were trifling. The crop is said to be a 16-anna one. Mr. Wood remarks: "The anna valuation as usual is perverse, the cultivator in all cases estimating the crop of experiment at 16 annas and the last crop of *juvār* grown on the same field at 8 annas, though neither season was much above or much below the average".

Experiment No. 35.—The Bodáli field gave a very superior outturn. Indeed, it was a very heavy crop: 1,327 lbs. of *juvār* per acre plus 345 bundles *kadbi* valued at Rs. 31-10-9. The assessment is Rs. 5-4-2 per acre. Forty cart-loads per acre of farm-yard manure are said to have been applied before sowing. The rate is probably exaggerated. Mr. Mollison thinks that even rice does not get so much as that. The rotation appears to be practically cotton and *juvār*, but this is not quite clear from the entry of column 10. The anna valuation is 16, and the outturn corresponds to a 17-anna formulæ yield. The incidence of assessment, 16·60 per cent., is fairly low.

Experiment No. 36.—The Sisodra field gave a very poor outturn. No manure was applied and the outturn is only half (499 lbs.) of that of the Vijalpor field. The assessment too is only half, Rs. 3-2-10 per acre. The subsidiary

pulses have been tested here, *tuver* giving 43 lbs. and *mag* 7 lbs. per acre. The incidence of assessment is very moderate, 21·15 per cent.

I now turn to the cotton tests. They were all done by myself and the crops were guarded in the same way as at Bārdoli. A curious and unsatisfactory point comes out. The fields most lowly assessed have produced far the best crops. I consider the cotton as a 16-anna crop throughout the district. The clear weather and absence of clouds favoured the maturing of the bolls and discouraged disease. The rate for cotton has been taken at Rs. 80 for the *bhar* of 24 Surat maunds which was the price ruling until the beginning of March.

Experiment No. 37.—Black soil of the kind mentioned above. The Khatedār and cultivator is a Dhed. I consider the crop as a 14-anna one as compared with other fields, but am content to admit that it may be, as it is said to be, a 16-anna crop as compared with the usual crop of the field. The Pot number measures 1 acre 30 gunthas and is assessed at Rs. 10-4 or Rs. 5-13-9 per acre, the original bhāg annas being 16.

The outturn of cotton was 317 lbs., which is a low outturn valued at Rs. 27-8. The incidence of assessment comes to 21·30 per cent. The cultivation is hardly good. But it cannot be described as indifferent. The field appears to be manured one-third every year. The cultivator told me he put 7 cart-loads before this crop on one bit, 8 last year on another bit and 9 the year before on a third bit. My 8 gunthas were chiefly in the bit manured with 8 cart-loads last year, but a small part was in the bit manured this year; which that bit was clear, as the plants were considerably taller and better developed in one corner of the field. The seed rate was given as 13½ lbs. per acre. Pickings on 8 gunthas were made thus :—

30th January, 5 *sers* 28 *tolas*; 16th February, 30 *sers* 12 *tolas*.

27th February, 22 *sers* 14 *tolas*; 12th March, 7 *sers* 22½ *tolas*.

and I have added a few *tolas* for a possible after picking. The field was, however, picked almost absolutely clean. The rotation is cotton and *juvār*.

Experiment No. 38.—The Pot number measured 2 acres 8 gunthas and was assessed at Rs. 8-10 or Rs. 3-14-9 per acre. The original classification annas are 15.

The cultivator is a Koli and the owner an Anavla Brāhman of Sarbhān, tāluka Bārdoli. The Anavla lets in all 8½ acres of land assessed at Rs. 32-15 plus Local Fund Rs. 2-1, in all Rs. 35, and the Koli pays Rs. 55-12 as rent. Profit to the owner is thus Rs. 20-12. For it is invariably the custom here for the superior holder to pay the assessment. The cultivation I characterize as good. A light dressing of 9 cart-loads of manure to the acre was applied. The anna estimate of the crop was 16. The gross outturn was 430 lbs. of seed cotton per acre, valued at Rs. 37-4-8. The incidence works out to 10·49 per cent. which is very low. Seed rate was given at 8 lbs. per acre which is probably correct here and the usual rate throughout the district.

Pickings on 8 gunthas were made thus :—

3rd February, 18½ *sers*; 16th February, 42 *sers* 3 *tolas*.

27th February, 22½ *sers*; 13th March, 6 *sers* 5 *tolas*.

I consider this crop a very fair average specimen.

Experiment No. 39.—This and the following were two fields close together, about a couple of hundred yards away. The outturn of the second field is much the better, because the land had been under grass till recently. The field of this experiment measures 3 acres 14 gunthas plus two gunthas for *kharāb* and it is assessed at Rs. 22-6 or Rs. 6-10-10 per acre as Natural Bāgāyat.

The cultivator is a Kanbi. The cultivation is good, that is to say, ordinary. Eight or nine cart-loads of manure are put on per acre every other year, before the cotton of the cotton and *juvār* rotation. The anna estimate is 16. In places the plants are a little far apart. The soil is the ordinary *kankari* black soil. The outturn was 341 lbs. seed cotton per acre valued at Rs. 29-9-4. Pickings from 8 gunthas were taken thus :—

29th January, 21 *sers*; 15th February, 37½ *sers*; 27th February, 12½ *sers*.

Seed rate was given as 12 lbs. per acre. Why this land was treated as Natural Bāgāyat I do not know. Besides cotton there is *juvār* (about 25 gunthas) and a

mango grove (about 15 gunthas). I found neither *juvār* nor mangoes entered in the Talāti's Form No. III, though of course they both ought to be. The land is ordinary Jirayat and there is no reason whatever for calling it Natural Bágayat. The owner has the right (*halk*) to take water from a well in another field (Survey No. 487) on payment of Rs. 5 per Bigha to the owner of the well. This well is called a *Sarkari* well in the *Káyam Kharda*. No one seemed to know why. The field of the experiment is not now under garden cultivation because it was not found to produce garden crops profitably.

Rs. 4-6 is entered in the remark column of the *Káyam Kharda* "for the use of the *Sarkari* well in Survey No. 487". This is included in the assessment of Rs. 22-6, but is not as usual shown in column 13 of the Form. It should not be levied at all; for the well is not in the possession of the man who owns Survey No. 498 and who is asked to pay for it, and he cannot use the water without paying the owner of the well for it. In fact if he uses the water he has to pay for it twice, and if he does not use it he has to pay for it once.

Experiment No. 40.—This field measures 5 acres 8 gunthas plus two gunthas *khuráb*. The original classification annas are 14. It is now under the ordinary cotton and *juvār* rotation, but three years ago it was a grass field which accounts for the superior yield. The cultivator is a Kanbi. No manure was put on. Seed rate is given as 12 lbs. Pickings from 8 gunthas were made:—

29th January, 33½ *sers*; 14th February, 38½ *sers*; 27th February, 26½ *sers*.

And I allowed ⅔ *ser* for subsequent ripening. The outturn is the best I have had, still I have often seen fields better. The incidence of assessment comes to 11·54 per cent., which is very moderate. Total outturn was 481 lbs. per acre valued at Rs. 41-10-8.

It may be noted that seven experiments on *juvār*, &c., gave an average incidence of 20·38 and I think that 20 will be found to be the average incidence of *juvār* for a 16-anna crop. Four experiments on cotton gave an average incidence of 15·63 and the dry crop of the cotton-*juvār* rotation pays an assessment which is 17·51 per cent. of the gross outturn. Average value of *juvār* crop comes to Rs. 22-7-4 and of cotton Rs. 34-0-2. Average value of the rotation Rs. 28-4 per acre. I believe these figures represent with very considerable accuracy what is actually the fact. And it must be added that what it is important to know is the proper-dry crop rate. Maximum rates for Jalálpor are at present:—

Village.	Group.	Maximum soil rate.		
		Rs.	a.	p.
Jalálpor	I	6	4	0
Vijalpor	I	6	4	0
Bodáli	II	6	0	0
Eru	III	5	8	0
Hansápar	III	5	8	0
Sisodra	III	5	8	0

I now turn to the rice tests. They are, I fear, of less value than the dry crop experiments. The rice year was, as I have remarked before, of rather an exceptional character owing to the failure of the later rains. Moreover, the experiments (3) which I could get were not sufficient in number. One of them was only on the first crop, as the second was sugarcane. Mr. Forbes of the Revenue Survey also did one experiment, but did not test the second crop.

Experiment Nos. 41 and 42.—This field gave extremely good results. It measures 1 acre 5 gunthas and is assessed at Rs. 19-8. It is made up of two parts, Bágayat 37 gunthas assessed at Rs. 18-4 or Rs. 19-11-8 per acre and Jirayat 8 gunthas at Rs. 1-4 or Rs. 6-4-0 per acre. It will be re-classed of course as rice land. The Bágayat is Natural Bágayat, there being no special water rate shown. The soil is the ordinary black *kankari* soil and it should not be classed as Bágayat. It is irrigated, for the first crop only, from a tank. The field grows rice and *vál* and sugarcane. For sugarcane, water from a neighbouring private well is available at a payment of Rs. 5 per Bigha (27 gunthas) per crop.

The variety of rice was *Jádu Salu* sold at 14 annas the Surat maund at Navsari. The seed rate was 104 lbs. per acre. Fifty-four cart-loads of manure per acre are said to have been put on before the rice; 25 cart-loads on $18\frac{1}{2}$ gunthas. I suspect this is rather an exaggeration, but I must say that the cultivator, an Anavla Bráhmaṇ, struck me as an extremely honest and straightforward man. He put the crop at 12 annas. The outturn was 3,349 lbs. grain per acre. The formula gives 3,000 lbs. for a bumper crop, but the commentary on this is that the formula is wrong. The rice is grown only in the Bágáyat portion, the rest of the field being grass and shrubs. The Bágáyat bit, 37 gunthas, is divided into two equal shares by a low *bándh* or *pál* the owners of which are different. The half in which I cut my rice and *vál* belongs to one Hari Gopálji, who owns in all 45 Bighas of land and has three *Hális* (servants). He told me he had four, but one ran away about a year ago. Hari says he is Rs. 3,000 in debt.

After the rice, *vál* and castor were sown. These plants do not grow like rice close up to the bank, because after the rice is taken off, the field is only roughly ploughed and the edges remain unploughed. It is a common practice to utilize the edges by sowing *san** (hemp) which will grow whether the soil is ploughed or not, the seeds being small. In this field there was no *san*, the cultivator saying he had no time to sow it; it was too much trouble. In consequence there was a rather broad bare strip all round, and I have allowed for this in plotting out the 8 gunthas which I measured for the *vál* test. I have always done this, as it is unfair to cut a bit out of the middle of the field as is sometimes done by experimenters.

The seed rate given for *vál* was 54 lbs. and for castor $5\frac{1}{2}$ lbs. per acre. No fresh manure of course was applied for the second crop. The outturn was 1,685 lbs. *vál* per acre and 27 lbs. of castor. There were also about 1,150 lbs. of *vál* leaves and husk useful as fodder. The total value of the second crop comes to Rs. 37-15-11 and of the year's outturn Rs. 122-6-8, which brings the incidence of assessment to 16·11 per cent.

Experiments Nos. 43 and 44.—The field of these experiments is a very similar one in the village of Hansápor. The Pot number measures 25 gunthas, assessed at Rs. 7-4, which include Re. 1-15-3 for tank water. The field grows much the same crops, rice, *vál*, castor and sugarcane. The cultivator is a Koli. He says he put on 35 cart-loads of manure per acre. The soil is *kankari* black soil. The seed rate was given as 154 lbs. per acre, a high rate. The outturn was 1,703 lbs. grain per acre, rated as a 16-anna crop by the cultivator, and I think probably a 12 or 13-anna one in reality. The value of gross outturn for the rice was Rs. 38-14-4, the variety being *Kada*. Sugarcane when grown is irrigated from a neighbour's well, the water of which has to be paid for. The second crop was *vál* and castor which gave a poor outturn, 335 lbs. of *vál* and 21 lbs. of castor. In the area cut there was a somewhat large patch of bare ground in which the *vál* would not grow owing to the shade of some mango trees. I allowed what I considered a proper proportion of bare ground in the area tested. But I am now sorry I did so, because the fruit of the mango trees is doubtless more valuable than the *vál* the trees prevent growing.

The incidence of assessment works out to 23·76 per cent. and in ordinary years it would be considerably lower.

Experiment No. 45.—The rice crop from this field at Vijalpor was very inferior, producing only 1,578 lbs. grain per acre valued, with straw, at Rs. 37-1-2. The anna valuation was given as 14. This is, I think, too high and I should be inclined to say that 10 or 12 would be nearer the mark. Twenty-five cart-loads of manure per acre were put on. The seed rate given was said to be $1\frac{1}{4}$ maund for 8 gunthas which equals 240 lbs. per acre. This, however, is not a fair way of calculating. For a small bit more seed proportionally is used than for a large piece. Moreover, some of this seed was intended for another rice field which was not planted afterwards, and I saw a decaying heap of seedlings lying on the ground.

* The seed produced from this *san* is then sown early next monsoon in a rice bed and subsequently dug in as green manure (*vide* Exp. No. 46).

The whole field of 2 acres 26 gunthas is divided into 5 Pot numbers. Pot No. 4 which I tested measures 37 gunthas and is assessed at Rs. 16-8 or Rs. 17-13-5 per acre as rice land. The field is about 300 yards from a small tank the water of which was nearly all dried up by the middle of October. The field appears to grow sugarcane once every four or five years, with rice and *vál* in the intermediate years. It has been planted with sugarcane this year, and therefore I could not test the second crop. The incidence on the rice this year was 48·11 per cent. This appears high, but I do not know that it really is, considering how much sugarcane is got off the field. Sugarcane is irrigated from a well in the field, which well was built some ten years after the original survey.

Of the Rs. 16-8 which is the assessment of the 37 gunthas, Rs. 5-5-1 is for the tank water *himáyat* or protection. The water from the tank is rated at Rs. 11-8 per acre as a 16-anna rate. The field of our test is assessed at 8 annas, an acre rate of Rs. 5-12 therefore or Rs. 5-5-1 for the 37 gunthas.

Experiment No. 46.—Mr. Forbes of the Revenue Survey reports an experiment on *Kolamb* rice at the village of Sari-buzrag in the south of the táluka. It is unfortunate that there was no second crop this year. It appears to be grown almost every year.

The land is alienated, village service Inám, land. It is a black soil field partly rice, 1 acre 2 gunthas assessed at Rs. 19-8, of which Rs. 7-8-9 are for tank water, and partly dry-crop, 12 gunthas at Rs. 1-8; total 1 acre 14 gunthas at Rs. 21. The 12 gunthas of *Jiráyat* have since been converted into rice land. Mr. Forbes has calculated the assessment per acre only on the 1 acre 2 gunthas of original rice. It comes to Rs. 18-9-1; calculated on the whole field, which all appears to be under rice now, it is Rs. 15-8-10.

Mr. Forbes says that till this year *Kada* rice was always grown, but as the field was damp in October, the sheaves had to be carted away to dry, and this year *Kolamb* was sown for the first time as an experiment. To try and make this experiment a success, the cultivator applied considerable quantities of manure. Seven gunthas of seed-bed had 10 carts of manure. To the rest of the field, presumably 1 acre 7 gunthas, 25 cart-loads of manure were applied. The land was then ploughed and $1\frac{1}{2}$ maunds of *san* seed, costing Re. 1 per $1\frac{1}{4}$ maund, sown. The *san*, when about two feet high, was ploughed in. The field was twice ploughed and then levelled. It was twice weeded. The crop was four times watered from a tank. When the rainfall is good, water is taken only once or twice or even not at all. This year the water was taken in the middle of September, and the beginning, middle and end of October. It appears that the end of October was rather late, as the crop was cut on 11th November.

The owner is said to let the field for the Government assessment, gaining himself only the difference between full assessment and *salámi*. The experimenter says that the Patel informed him that land in the village is usually let at a profit of Rs. 7 per acre, but as this field cannot grow sugarcane owing to its being slightly salt, and there being no wells near it, only the Government assessment is got.

The outturn estimated by the experimenter as a 16-anna crop was 2,600 lbs. Mr. Forbes did not allow for dryage, as he states that he found no difference after a fortnight. I have taken a reduction of 2 per cent and enter the grain outturn as 2,548 lbs. and total value at Rs. 70-8-11. Incidence then works out to 26·31 per cent.

There are four experiments on garden crops—two on sugarcane by Mr. Fernandez, Deputy Superintendent Gujarát Revenue Survey, one on sugarcane by myself, and one on groundnut by myself. In addition to these I have added to the list an experiment on castor seed by Mr. Weir in 1893 and five experiments on sugarcane, one by Mr. Robertson in 1887, one by Mr. Moore in 1888, one by Mr. Maconochie in 1891, one by Mr. Doderet in 1893 and one by Mr. Cadell in 1895. We have therefore a series of eight experiments on Jalálpor sugarcane, and as the tests were taken by different officers in different years and all, I think I may say, with care, they give a very fairly accurate indication of what the outturn of *gol* per acre really is. There are three varieties commonly grown in

Jalálpor—*Ráti*, *Malbári* and *Vánsi*. *Ráti* is the dark purple variety which I experimented on in Bárdoli. It is not so common in Jalálpor. *Malbári* is considered the best, but it will not grow everywhere, for instance in Jalálpor Kasba. *Vánsi* (like a bamboo or *vans*) is a common variety. The canes are thin, white and rather tall. *Malbári* and *Vánsi* are grown mixed sometimes; they were in Mr. Doderet's test in 1893.

Experiment No. 47.—The sugarcane experimented on was *Vánsi*. The field measures 2 acres 38 gunthas and is assessed at Rs. 24-8 or Rs. 8-4-11 per acre as Natural Bágáyat. The soil is *besar*, but not the rich garden soil which can be classed as Uttam Bágáyat. The original Bhág annas have not been deduced. The land grows sugarcane once in four years and such crops as *tuver*, *san* and groundnut between. The cultivator told me that he had given up growing groundnut, as he found that sugarcane and groundnut was not a good combination. I should have supposed groundnut an excellent rotation crop myself, provided the land was manured for it.

Thirty cart-loads of farm-yard manure per acre were put on before sowing and about 54 cart-loads of fresh soil were spread on afterwards. The seed rate was 14,000 sets of cane per acre or 1,000 canes of 6 *háths* each, planted in January 1895. The *gol* produce per acre was *5,538 lbs. and there were 8,000 lbs. green tops and outer leaves not weighed. The green tops are usually given to the bullocks which work the roller. The outer leaves are either burnt or used for thatching purposes. The fuel for the furnace is mostly composed of the dry refuse of the cane after the juice has been crushed out. The gross value of the outturn was Rs. 272-8, calculating the price of *gol* at Rs. 1-14 per Surat maund or 20½ lbs. per rupee. Mr. Cadell in his experiment last year took exactly the same price. I ascertained the price in the Navsari Bazár for the particular specimen of *gol* produced. It is of course well known that the price of *gol* is going down—a good deal comes down now from the North-Western Provinces, especially Cawnpore. The press used was a three-roller iron one. Almost all the presses in use now are iron. The incidence of assessment comes to 3·04 per cent.

I have not described the cultivation because it has frequently been described before, because I shall have occasion later on of describing exactly similar cultivation, and because the two following experiments conducted by Mr. Fernandez and analysed by Mr. Mollison show exactly the methods of this part of the world. I shall later on give a table showing the results obtained from all the sugarcane tests in the Jalálpor taluka. I may here say, however, that *Vánsi* cane is not usually planted like the *Malbári* cane of Mr. Fernandez's experiments by means of a plough with a tube. The pieces of cane are simply trodden into the soft wet soil.

Experiments Nos. 48 and 49.—Mr. Mollison has analysed these two experiments as follows :—

“These two experiments on sugarcane were taken on two consecutive days in Munsád. The first field was not well fenced, and jackals had done damage. In this field the test area was only 1 guntha and perhaps it was not sufficient to get a fair average for the field. In selecting the test area, count should have been taken of damage done by jackals and also of the usual inferiority of the crop round the headlands. The outturn from each field is well above average judging by the results of careful tests in former years in the same taluka. I fear that the actual outturn per acre would fall short of the acre average as calculated from the results of the test areas. It is, however, likely, as Mr. Fernandez reports, that ‘although the soil is not of the superior order, yet with plenty of water at command and intelligent cultivation sugarcane can be grown with handsome profit.’ The soil of each field is of like character, being black with a reddish tinge and classable at 16 annas. The respective assessments, soil and water combined, are Rs. 10 and Rs. 9-4-9 per acre. Each number is irrigable from a well, the water being abundant up to April and somewhat scant afterwards. The late rains were deficient in 1895-96, but this could hardly have affected the crops, as they were harvested in November. The late rains of 1894 were unusually abundant, and it may be presumed that during the hot weather of 1895 the water in the wells was less scant than usual. Both fields grow usually rice and second

* The actual weight, not the commercial weight which assigns a fictitious weight for the pots,

crop of *vál* and castor. In the first field cane has usually been grown every sixth year. In the second field it was grown for the first time. No manure was given to the field before plantatation, but a top dressing of 58 maunds or approximtaily 2,230 lbs. of castor cake per acre was given in July. Thirty loads of farm-yard manure was given for the previous rice crop and the field was obviously in good condition, or it would not have yielded so well. The first field got a direct application of 20 loads of cow-dung manure, apparently to 38 gunthas, before plantation. The application to the previous rice crop was 40 cart-loads; the sugarcane was top-dressed in July with 70 maunds of castor cake.

"The cane was planted with the plough, whole canes being used. The canes are passed through a hole drilled in a slowly backward direction through the body of the plough and left imbedded in the soil in the furrow and about 8 inches deep. This operation is facilitated by a man following the plough and trampling each cane into the furrow as it is pushed through the hole in the plough. The seed rate is calculated in lengths of 6 *hátbs* (about 9 feet); 2,600 six-*hath* lengths were planted in the first field and 2,500 in the second. No single cane would be 6 *hátbs* long, probably on an average 2 to 2½ canes* would be required for this length. The fields were watered when planted and not again for eight weeks. The first field was irrigated in all fourteen times—and mostly during the hot season; 2 waterings were given during the rains and 2 after they ceased. The second field was irrigated twelve times before the rains, once during and twice after. Generally throughout Gujarát it is customary to put *gol* in earthenware pots; when sold, a deduction of 5 *seers* per maund is allowed on account of the pots. Mr. Fernandez found by actual test in the first experiment that the weight of pots exceeded the allowance made. He, however, adopted the commercial weight, which of course at market rates shows the correct value per acre of each crop.

"The exact per acre weight of *gol* in the first experiment is given, but in the second experiment the weight of *gol* is only approximate, because Mr. Fernandez did not test the weight of earthenware pots as he did in the first experiment. Applying the same data to both experiments the weights of the various products are as under :—

	1st Experiment Lbs.	2nd Experiment Lbs.
Cane-topped	68,824	81,415
Juice	48,849	56,437
Gol	8,049	8,972
Percentage of juice to cane	70·97	69·32
Do. of Gol to juice	16·47	15·89
Do. of Gol to cane	11·69	11·02

The incidence works out to 2·15 per cent. in the first experiment and 1·83 per cent. in the second."

The field of Exp. No. 48 measures 38 gunthas and is assessed at Rs. 9-8 or Rs. 10 per acre. It was classed as rice land. Gross outturn worth Rs. 464-4-9 per acre.

The field of Exp. No. 49 measures 2 acres 34 gunthas and is assessed at Rs. 26-8 or Rs. 9-4-9 per acre. There is no tank rate, but a well *kasar* of Rs. 1-8 is included in the Rs. 26-8. It was classed as rice land and the value of gross outturn comes to Rs. 494-11-7 per acre.

Both fields are sugarcane growing rice fields.

It will be noticed how much heavier the outturn of Mr. Fernandez *Malbári* cane is than that of any *Vánsi*. I should like to have had some more experiments and I am rather inclined to think that the results here obtained are a little more than can usually be expected. But Mr. Doderet's mixed *Malbári* and *Vánsi* test in 1893 gave better results than any of the *Vánsi* tests, and in the case of *Malbári*, the percentage of *gol* to cane was 11·3 and with *Vánsi* 6·5.

Of Survey No. 481 (Exp. No. 49) Mr. Fernandez mentions that the land is Ját Inám belonging to a Navsari Parsi, who lets it to a Kanbi of the village for Rs. 40 plus Rs. 11-8-6 to Government for *salámi* and Local Fund, in all Rs. 51-8-6. The field has been with the Kanbi family for two or three generations. The

* From 2½ to 3 canes.

rent appears to me large. Not only so, but it is the almost universal practice in the Surat district for the superior holder to pay the Government dues. The Mámlatdár informs me in answer to a reference that the Rs. 11-8-6 is deducted from the Rs. 40 rent. Mr. Fernandez remarks that the rayats of Munsád are all involved in debt, and decides that this is due to increase of population and lack of manure.

Mr. Fernandez says the results of the experiments show that "sugarcane can be cultivated with handsome profit." But the profit depends almost entirely upon the cost of cultivation in the case of a crop like sugarcane, and we are not told what that came to. It is well known of course that a successful sugarcane crop pays.

Mr. Fernandez describes the press thus:—The "*kolu* or press is of iron, made in Bombay by a Kachchi iron-master, and has been in use for three years without needing any serious repairs. The pattern has become popular and there are eight such presses in the village. They are hired out at from 12 annas to one rupee per diem and cost in all about Rs. 100 each. The cost in Bombay is Rs. 90. Their advantages over the wooden presses are: (1) they require much less bullock power, (2) turn out $\frac{1}{3}$ as much work again, (3) press out more juice from the same quantity of cane and (4) are more durable and far more economical in the end. They work silently, whereas the moans and groans of the wooden press are heard in the dead of night quite half a mile off."

I do not know whether the cultivator appreciates the absence of moans and groans in the dead of night so much as the District Officer!

I give here a table comparing all the sugarcane experiments:—

Date of Experiment.	Experimenter.	Experiment.	Number of canes.	WEIGHT OF			Total value of produce.	PERCENTAGE OF	
				Canes.	Juice.	Gol.		Juice to cane.	Gol to cane.
				Lbs.	Lbs.	Lbs.	Rs.		
3rd February 1891 ...	Mr. Maconochie ...	Vánsi ...	51,000	63,080	30,690	5,230	3.2	48.65	8.29
14th and 15th December 1893 ...	Mr. Doderet ...	Mixed Vánsi and Malbári.	37,240	72,400	34,090	5,712	2.68	47.08	7.88
27th January 1895 ...	Mr. Cadell ...	Vánsi ...	25,680	54,978	29,341	4,945	2.65	55.39	9.33
17th November 1895 ...	Mr. Fernandez ...	Malbári ...	...	68,824	48,849	8,049	4.64	70.97	11.69
18th Do. ...	Do. ...	Do. ...	...	81,415	56,437	9,972	4.95	69.32	11.02
28th January 1896 ...	Mr. Seddon ...	Vánsi ...	38,640	53,885	33,000	5,538	2.72	61.24	10.27

Experiment No. 50.—This is a groundnut test at Jalálpor. The field measures 4 acres 21 gunthas plus 2 gunthas *kharab* for a well and is assessed as Natural Bágáyat at Rs. 53 or Rs. 11-11-5 per acre.

This field has been an absolute puzzle to me. How it was originally assessed I have been totally unable to comprehend, and Mr. Fernandez has told me that he does not understand either. The land was classed as Bágáyat. In column 20 of Village Form No. I is the remark that there is a well rate (*kasar*) on this field. The amount of this rate is not, as usual, shown in column 13. I endeavoured to find out what it was. The information was not available from the Survey authorities. I, however, found an old *Bágáyat Phálavani takta*. This statement says in one place that the *kasar* is Rs. 28 and in another that the land is Natural Bágáyat (*numero bháthama gaya chhe*). But it was absurd to have *kasar* for a Natural Bágáyat number. For the Natural Bágáyat class was devised simply to get rid of the *kasar* for a particular class of land.

However that does not much matter. The puzzle will have to remain. The field belongs to an Anavla Bráhmaṇ who lets it to another Anavla together with some other land. Separate details are not available, but parts of 9 survey numbers whose area is 14 acres 24 gunthas and assessment Rs. 109-2-10 are let for Rs. 159. The superior holder as usual pays the assessment and the Local Fund, so that the profit is only Rs. 43 about.

The field produces sugarcane and groundnut alternately, two crops in three years, with a little castor sometimes planted with the groundnut. The cultivator said the soil was not so good as it once was. I am not at all surprised. Besides the yearly crops there are 13 mango trees and one or two small date palms, also a few plantains.

There was no manure put on for this crop. The field is divided into two halves. One half is manured and then grows sugarcane and the other grows groundnut. Twenty-five to thirty pounds of seed per acre were sown in June. The outturn was 1,846 lbs. of fresh nuts (unhusked) per acre and the incidence of assessment works out to 20·02 per cent. The soil is brown; the season fair, and anna valuation 14. The outturn is poor. It is for fresh unhusked nuts. I am very much inclined to think that here as in many other cases the formulæ are wrong and badly want revising. The price of fresh unhusked nuts in the Navsari Bazar was Rs. 1-2-8 per Surat maund.

CHORA'SI TALUKA.

Thirty-three experiments were made in this taluka—6 on rice by Mr. Mehta, 5 on *juvâr* and 2 on gingelly seed by myself, 2 on *juvâr* by Mr. Mollison, 4 on cotton by Mr. Mollison, 6 on garden crops by myself and 8 by Mr. Mollison. With the exception of one experiment by Mr. Mollison on potatoes at Kumbharia in 1894 and one on *vâl* by Mr. Nánávati in 1891, no experiments in the taluka have before been recorded. I proceed to analyse the dry-crop experiments beginning with *juvâr*.

Experiment No. 51.—This is an experiment on *juvâr* at Magob, one of the group of garden villages south-east of Surat, of which Kumbharia is the best known. The field measures 8 acres 34 gunthas and is assessed as Jirayat at Rs. 45 or Rs. 5-1-4 per acre. This is very light assessment compared with the rates at Vijalpor and Jalalpor in the Jalalpor taluka. In my opinion the assessment of this group might very well be raised, and I believe I am correct in stating that this was Mr. Mollison's opinion too. The soil of the field of this experiment is the dark brown rich garden soil. Garden crops could perfectly well be grown in it with irrigation. The only difference there is between the Bágayat and the Jirayat soils of this group appears to be due entirely to the larger application of manure to the one than to the other. The soil is undoubtedly a variety of black soil, but is browner and more sticky than the ordinary black soil. It is the finest soil in the district that I have seen. Water is near the surface, abundant and sweet.

The field is Girasia Inam paying a *salâmi* of Rs. 32-12. The cultivator is a Rajput. The field is divided into two parts, half belonging to the owner of one bit, who grows cotton and *juvâr*, and half to another, who lets it to a cultivator from the neighbouring Sachin State village of Puna, who grows garden crops. A large amount of the Magob land is under garden cultivation, but all the cultivators are Puna men. The seed rate given was 8 lbs. *juvâr*, 3½ lbs. *tuver*, and ½ lb. each of *mag* and *choli*. The last two came to nothing. Twenty cart-loads of farm-yard manure per acre are said to have been applied. If this be true for last year, it would not be true for every year.

The crop seemed a fairly good one, estimated at 16 annas. It was very tall, but the heads not above the average size. It was a typical crop of its kind *juvâr* on good soil manured a little. The outturn per acre was 1,149 lbs. *juvâr* and 46 lbs. *tuver*, valued, with byproducts, at Rs. 38-2-5. The incidence of assessment works out to 13·32 per cent. The *juvâr* was the yellow variety known as *Pirio*. Its price in the Surat Bazar was Rs. 28 per *gâli* of 30 Surat maunds.

The field is re-classed as Natural Bágayat at soil 16 and subsoil 4 annas or, with Rs. 6-8 maximum rate, at Rs. 8-2 per acre which is a considerable rise.

The prices of grain upon which my calculations are made, are the prices in the Surat Bazar, at the time, minus octroi and toll charges, *viz.*, *juvâr* (*Pirio*) Rs. 27-8 per *gâli* or 42 lbs. per rupee; *juvâr* (*Chapti*) Rs. 29-8 per *gâli* or 39½ lbs. per rupee; *tuver* Rs. 34-8 per *gâli* or 33½ lbs. per rupee. A *gâli*=30 Surat maunds.

Experiment No. 52.—This is another very similar field at the same village. Manure rate given was 17 cart-loads per acre and seed rate 8 lbs. *juvâr*, 3½ lbs. *tuver* and ½ lb. each of *choli* and *mag*. The outturn, estimated as a 14-anna one, was 1,092 lbs. *juvâr* and 18 lbs. *tuver* valued, with byproducts, at Rs. 34-12-5; the

juvâr is yellow *Pirio juvâr*. The land is Girásia Ját Inám. It measures 14 acres 6 gunthas and is assessed at Rs. 69 as Jiráyat or Rs. 4-14 per acre. It pays a *salámi* of Rs. 53-3. The incidence of assessment is 14·02 per cent.

The land is re-classed as Natural Bágáyat at the same rate as the last experiment, Rs. 8-2 per acre with Rs. 6-8 soil maximum.

Experiment No. 53.—The field is at Althán, a village about 3 miles south-west from Surat. The soil is black soil. The field measures 9 acres 17 gunthas and is assessed as Jiráyat at Rs. 47-8 or Rs. 5-0-8 per acre. The outturn, 754 lbs. *juvâr* and 14 lbs. *tuver*, is estimated as a 12 or 13-anna crop. No manure was applied, but two years ago some was put on. The seed rates given were 6 lbs. *juvâr*, 3 lbs. *tuver*, and $\frac{1}{2}$ lb. *mag* per acre; the *juvâr* is yellow *Pirio juvâr*. The cultivator is an Anavla Bráhmaṇ. The *juvâr* appeared to me slightly affected by the short rainfall. The incidence of assessment is 20·29 per cent. Next year's crop will be cotton.

The village is near the salt land and there is some salt in its soil. Water is usually brackish.

One further remark should be made which applies to all *juvâr* experiments made on lands near Surat. *Juvâr* straw, *kadbi*, is in great demand and sells for an average price of Rs. 2-4* per hundred large bundles. Deducting cartage and tolls I have priced it at Re. 1-14 per hundred. Thus expressed in money the value of the byproduct is about 5 times as much in Surat as in Bárdoli. But to the ordinary cultivator who does not sell it, but uses it all at home, a cart-load of *kadbi* is worth the same whether he lives at Bárdoli or at Surat. The result is that percentage incidences near Surat are too low and near Bárdoli too high.

Experiment No. 54.—Another field at Althán measuring 5 acres 8 gunthas and assessed as Jiráyat at Rs. 32-8 or Rs. 6-4 per acre. The soil is *kankari* black soil. It was dressed with 8 cart-loads of manure per acre. *Juvâr* (*Pirio*) alone was tested, as the subordinate pulses were failures. Seed rates given were 6 $\frac{2}{3}$ lbs. *juvâr*, 3 $\frac{1}{2}$ lbs. *tuver* and a handful of *mag* and *choli* per acre. Acre outturn of grain was 1,136 lbs. valued, with byproducts, at Rs. 33-13-3, giving an incidence of assessment of 18·47 per cent. which appears high for so good a crop. *Juvâr* is grown every year and there is no cotton grown. The owner, a Koli, has only this one field and under these circumstances he finds cotton too risky a crop.

Experiment No. 55.—A third field at Althán; area 3 acres 23 gunthas assessed at Rs. 20-8 or Rs. 5-11-9 per acre. This field like the last grows *juvâr* every year. The cultivator is a Sutar and this is the only field he has. Subordinate pulses were a practical failure. Seed rates were the same as in the last experiment. No manure is ever applied, because the cultivator has no cattle. The *juvâr* is *Pirio juvâr* mostly, but mixed. The crop is said to be a 17-anna one for the field. The outturn, however, was very low, 670 lbs. grain per acre, worth, with byproducts, Rs. 20-2-6. The incidence of assessment is very high, 28·45 per cent.

Mr. Mollison has submitted six experiments on dry crops, two on *juvâr* and four on cotton.

Of *juvâr* Mr. Mollison remarks:—"The crops throughout the taluka are with trivial exceptions very even and are above the average of ordinary years. The season for *juvâr* was more than ordinarily favourable, but for *tuver*, which is grown subordinate to *juvâr* in almost every field; it was unfavourable. In many fields although the usual amount of *tuver* was sown there is hardly a trace of this pulse. In the field tested (Exp. No. 56) there was a fair sprinkling of dwarfed plants. The usual rotation is cotton and *juvâr* but within late years the rotation has been extended in many fields, by the addition of *tal* (sesamum). The oil-seed itself pays in a favourable season and is believed to be a good preparatory crop for either *juvâr* or cotton. The black-soil fields in the village are rarely manured, the available supply of manure going chiefly to the rice fields." Mr. Mollison describes *juvâr* cultivation thus:—"The field was twice harrowed before the rains and twice ploughed after the soil was sufficiently moistened by rain. The seed was drilled with a two-rowed drill; the rows were 18 inches apart. In different fields the width

* Mr. Mollison only gives Rs. 1-8 for large bundles.

between the rows varies from about 18 to 24 inches. The drill is generally followed by two harrows covering the seed; about $6\frac{2}{3}$ lbs. *juvār* and $3\frac{1}{2}$ lbs. of *tuvēr* per acre is the common seed rate. The crop is hand-weeded as soon as the young seedlings are well up, say 15 days after sowing. It is subsequently bullock-hoed twice and thinned out. The most vigorous plants are left about 18 inches apart in the rows. Finally the plough is passed between the row, the effect being to break up the surface and conserve moisture. The date of this operation depends upon the previous rainfall. Usually it is done in September but sometimes in October."

Experiment No. 56.—The crop tested was unmanured Sholāpuri *juvār*, a straight-headed variety. The outturn, reckoned as an 18-anna crop, was 1,063 lbs. *juvār* plus 36 lbs. *tuvēr* with 277 bundles *kadbi* valued at Rs. 30-3-8. The soil is black soil assessed at Rs. 6-1-1 per acre and the incidence works out to 20-06 per cent. Mr. Mollison priced *juvār* at 43 lbs. Sholāpuri and 41 lbs. Deshi per rupee and *tuvēr* at $32\frac{1}{2}$ lbs. and *kadbi* at Re. 1 small and Re. 1-8 large bundles per hundred. I think *kadbi* is usually more valuable near Surat. Mr. Mollison neglects the other byproducts as a set-off against the fact that the cultivated area of a field is always less than the assessed area.

Experiment No. 57.—Like the last this test was taken at Althān in black soil land. Part of the field is black, part *gorādu* (light). The black soil is unmanured. The *juvār* was Deshi, *Pirio* or *Chapti* not stated. The field was carefully tilled, being remarkably free from weeds. It is assessed at Rs. 6-1-2 per acre. *Juvār* gave 1,070 lbs. grain plus 285 bundles *kadbi* and 30 lbs. *tuvēr* per acre, and the value of gross produce was Rs. 31-4-5. Incidence works out to 19-41 per cent. Mr. Mollison thinks the best fields in the village might give one-fifth more than these two.

The cultivator of Survey No. 49 (Exp. No. 57) is an Anavla Brāhman. He rents other lands from a Surat Bania—

Field.	Area.	Assessment.	Rent.
	A. g.	Rs. a. p.	
Survey No. 46 (black soil, Exp. No. 62)...	4 35	28 8 0	} Rs. 12 per Bigha (23 gunthas).
Survey No. 149 (Gorādu soil) ...	5 29	46 8 0	

He sublets Survey No. 149 at Rs. 18 per Bigha or Rs. 31 per acre; also rents to the same tenant—

Field.	Area.	Assessment.	Rent.
	A. g.	Rs. a. p.	
Survey No. 148 (Gorādu soil) ...	4 16	27 8 0	Rs. 18 per Bigha.
Survey No. 84 (black soil) ...	2 14	13 8 0	Rs. 8 per Bigha or Rs. 14-12 per acre.

The superior holder in all cases pays Government dues. All the fields lie close to the village.

The cultivator's family consists of 16 persons—three of whom work more or less in the fields. He hires three servants by the year, finding them food and clothing and paying them also Rs. 25 per annum. He owns two pairs of bullocks and 15 other cattle, mostly buffaloes.

Of cotton Mr. Mollison took four tests in Chorāsi. Neither here nor in Olpād did he guard the fields, but is sure that no tampering was tried. I do not myself believe that any cultivator would try to spoil an experiment. They often dislike experiments, but that is because they are sometimes put to loss and

bother by them. I have never detected any attempt to tamper with the produce. Mr. Mollison thinks the cotton crop this year probably a better one than usual and as good as that of 1893-94. He says that the average is much more level in Chorási than Olpád and that the cultivation is better in the former. Cotton boll-worm did a good deal of harm this year and will, Mr. Mollison thinks, continue to do harm so long as seed is bought at the nearest ginning factory. Mr. Mollison mentions the common opinion that in Surat and Broach cotton is the paying crop, and disagrees at any rate in the case of Surat. "The difference in value between an average crop of cotton and an average crop of *juvár* is not as great as is currently believed." I am inclined myself to think that the whole difference vanishes when one allows for the greater riskiness of cotton. Mr. Mollison believes that, taking one season with another, the incidence of assessment on gross value of cotton is well over 20 per cent.

Experiment No. 58.—This was taken on cotton at Magob, one of the garden villages south-east of Surat. The soil is brown black. Abundant sweet water is available at a moderate depth. Cotton and *juvár* are sown alternately. Garden cultivation is extending. Mr. Mollison agrees with me that the soil assessment of this group of villages is low and will bear increase. The field bears an assessment of Rs. 6-15-2 per acre. *Juvár* is said to have been manured for the previous year at the rate of 30 cart-loads for 2 acres 15 gunthas. The crop is said to be a 16-anna crop. Gross outturn was 402 lbs. seed cotton valued at Rs. 34-13-9, at Rs. 80 per *bhár* of 24 maunds. Incidence comes to 19·93 per cent. The pickings from 8·9 gunthas were:—

22nd January, 36 lbs.; 8th February, 39 lbs.; 21st February, 14½ lbs.

Mr. Mollison gives a description of cotton cultivation—"The *juvár* stubble, which is generally of considerable length, is removed during the fair season and used as fuel. The harrow is generally used before the rains once or twice; as soon as the soil is moistened a span deep by the first rain, the field is ploughed. It may be further worked with the harrow used once or twice. If necessary the surface is levelled with the *samár* (plank roller). The foregoing operations should be completed as expeditiously as possible, as cotton ought to be sown in June. The seed is drilled through a two-coultered drill, the seed tubes being of larger diameter than an ordinary grain drill. The seed rate varies from 7 to 10 *sers* per Bigha. This is much more than is absolutely necessary, but cotton seed is cheap. Two harrows follow one drill to cover the seed and smooth the surface. The crop is generally intercultured with the bullock-hoe two to four times and hand-weeded once or twice. Interculture begins when the seedlings are about 4 inches high. When they have made some progress the weaklings are thinned out. The rows may be from 18 to 24 inches apart and the plants stand 18 inches or less apart in the rows. Cotton must be kept quite free of weeds or it will not thrive. The plough is passed between the rows in September or October. Cloudy weather during the flowering period and later is very harmful. Many bolls drop to the ground before they ripen. Boll-worm also does much harm. Picking begins in January and lasts in a season of favourable late rainfall on to March and in late crops to April. Picking is done as early in the morning as possible. The mature leaves get dry and crisp, and stick to the lint in the afternoon."

The stalks are not valued in this or any experiment. They are used as fuel or to make *tattis*.

Crops in experiments (Nos. 59 and 60) taken at Althán, Mr. Mollison considers average ones for the greater part of the Chorási taluka. Each crop was estimated locally at the maximum—20 annas. I think this is too high and the proper valuation is 16 or possibly 17.

Experiment No. 59.—The field is black soil, all under cotton this year; area 15 acres 2 gunthas assessed at Rs. 88-8 or Rs. 5-14-1 per acre and cultivated by a Kanbi who has in all 110 Bighas of land. The part of the field in which the test was taken grew last year a mixed crop of *vál* and castor. Of the Kanbi's land 4 Bighas are rice, 6 arable *gorádu*, 8 *gorádu* under grass and 10 black soil under grass. He owns 6 bullocks, 2 cows, 12 buffaloes, and bought last year 60 loads manure. The rice land and the cultivated *gorádu* gets most

of the manure, but the black soil is also manured to a very fair extent. Ten loads per Bigha were put on before the cotton. The outturn was 394 lbs. seed cotton valued at Rs. 34-1-11, and the incidence 17·23 per cent. Pickings on $9\frac{1}{2}$ gunthas were :—

24th January, 52 lbs. ; 11th February, 31 lbs. ; 23rd February, 10 lbs.

Experiment No. 60.—The next field is also black soil. Its area is 2 acres 25 gunthas and assessment Rs. 15 or Rs. 5-11-5 per acre. Only Rs. 3-12-0 is paid as *salámi*, the field being Inám. Four consecutive crops of *juvár* were taken, before this year's cotton. No manure was applied, though it is said to be sometimes given. The field was carefully cultivated. The crop was picked three times and yielded 387 lbs. seed cotton worth Rs. 33-8-11. The incidence of assessment comes to 17·02 per cent. Pickings on 7·8 gunthas were :—

25th January, $26\frac{1}{2}$ lbs. ; 11th February, 38 lbs. ; 23rd February, 11 lbs.

Experiment No. 61.—Black soil in the village of Bhatár, an Inám field. The occupant has about 85 Bighas, of which 7 are grazing and 4 hay-land. He has no rice land, but grows occasionally 2 or 3 Bighas of chillies, which require a good deal of manure. He uses all the manure produced by 6 bullocks, 5 buffaloes, 3 cows and 5 younger animals. He states that the tested field was manured each of the last three years, amounts alleged not given. Mr. Mollison does not believe this, but thinks that the field really is regularly lightly manured. The field is 2 acres 36 gunthas assessed at Rs. 16-8 or Rs. 5-11 per acre. Only Rs. 11-4 *salámi* are paid. The rotation of cotton and *juvár* is practised. The crop is estimated at 18 annas and the gross produce was 348 lbs. seed cotton valued at Rs. 30-2-3. Incidence works out to 18·87 per cent. I am myself inclined to think Mr. Mollison's anna estimate a little high throughout.

The 7 *juvár* experiments show an average outturn of Rs. 30-7-6 per acre and an average incidence of 18·33 per cent. The four cotton experiments show an average outturn of Rs. 32-2-8 per acre and an average incidence of 18·26 per cent. The average outturn and incidence of the rotation are Rs. 31-13-1 and 18·29 per cent. There can be little doubt that, taking one year with another, one-fifth of the produce of dry-crop cultivation is taken for the Government assessment.

Experiment No. 62.—An experiment on gingelly seed or sesamum (*tal*). The field is Jiráyat; area 4 acres 35 gunthas; assessment Rs. 28-8 or Rs. 5-13-6 per acre. The crop is a 12-anna one. No manure was put on, but some is applied every two or three years. The rotation is cotton and *juvár*, with gingelly seed occasionally. The crop is not much cultivated in Chorási but fairly extensively in Olpád. It is hardly a paying crop in itself, but is believed to be a useful rotation crop. One pound seed per acre is applied, sown with a two-coultered drill (*phadko*) in the same way as cotton and *juvár*. The seed being very small is frequently mixed with earth before being drilled, in order to prevent its falling too thick. The outturn is 202 lbs. oil-seed per acre valued at Rs. 14-0-7. The price of the seed was Rs. 20 per *háro* of $7\frac{1}{2}$ Surat maunds or $14\frac{3}{4}$ lbs. per rupee. Incidence comes to 41·63 per cent. A handful of *tuver* is usually in this district sown with *tal*. In this experiment there were hardly any *tuver* plants to be seen.

It is the custom to pull the plant up and not to cut it with a sickle. The cultivators hold that if the plants are cut, the quantity of oil got from the seed is smaller. The stem would, I suppose, bleed to a certain extent.

The plant is ready to be pulled up as soon as the leaves fall off. The seed pods are still green. Each plant's root is made as free from loose earth as possible, and bundles are made and left in the sun. The pods gradually open and in four or five days the plants are held upside down and shaken, when the seed falls out. This is repeated a few days afterwards for the pods that were still at the first shaking green.

Experiment No. 63.—The yield of this field is much better, being 372 lbs. oil-seed worth Rs. 25-13-3. The land is assessed as Bágáyat at Rs. 8-7-8 per acre, and the incidence comes to 32·82 per cent. The land had a slight dressing of 4 cart-loads manure per acre. The land chiefly grows cotton, but it has a well under which chillies and brinjals are grown. By revision survey the land is reclassified as Jiráyat with $12\frac{1}{2}$ annas for soil and nothing for subsoil. At present the

total assessment of the 7 acres 3 gunthas is Rs. 60, of which Rs. 24-6 are for water. Under the revision survey there appears to be no water rate at all. The land being Ját Inám pays not the full assessment but a *judi* of Rs. 25. It is let by the owner to a Kanbi on an eleven years' lease at Rs. 86 per annum, the superior holder paying *judi* and Local Fund. I was told that a rent of Rs. 90 was paid till lately, but the cultivator threw it up and a new tenant was found at Rs. 86.

The following table shows the particulars of outturn, re-classification, &c., or dry crops :—

Village.	Field.	Crop of test.	Value of gross produce per acre.	Assessment per acre (original survey).	Percentage incidence of assessment.	Bhág annas (revision survey).	Assessment per acre (revision survey).
			Rs. a. p.	Rs. a. p.			Rs. a. p.
Magob ...	Survey No. 31 (Exp. No. 51).	Juvár, &c. ...	38 2 5	5 1 4	13'32	Soil ... 16 Subsoil . 4	8 2 0
Magob ...	Survey No. 30 (Exp. No. 52).	Juvár, &c. ...	34 12 5	4 14 0	14'02	Soil ... 16 Subsoil . 4	8 2 0
Althán ...	Survey No. 2 (Exp. No. 53).	Juvár, &c. ...	24 13 10	5 0 8	20'29	Soil ... 14½	5 14 3
Althán ...	Survey No. 26 (Exp. No. 54).	Juvár, &c. ...	33 13 3	6 4 0	18'47	Soil ... 15½	6 4 9
Althán ...	Survey No. 24 (Exp. No. 55).	Juvár... ..	20 2 6	5 11 9	28'45	Soil ... 14	5 11 0
Althán ...	Survey No. 19 (Exp. No. 56).	Juvár, &c. ...	30 3 8	6 1 1	20'06	Soil ... 14½	5 14 3
Althán ...	Survey No. 49 (Exp. No. 57).	Juvár, &c. ...	31 4 5	6 1 2	19'41	Soil ... 15	6 1 6
Magob ...	Survey No. 46 (Exp. No. 58).	Cotton ...	34 13 9	6 15 2	19'93	Soil ... 19	7 11 6
Althán ...	Survey No. 44 (Exp. No. 59).	Cotton ...	34 1 11	5 14 1	17'23	Soil ... 14½	5 14 3
Althán ...	Survey No. 42 (Exp. No. 60).	Cotton ...	33 8 11	5 11 5	17'02	Soil ... 14	5 11 0
Bhatár ...	Survey No. 119 (Exp. No. 61).	Cotton ...	30 2 3	5 11 0	18'87	Soil ... 15	6 1 6
Althán ...	Survey No. 46 (Exp. No. 62).	Gingelly seed .	14 0 7	5 13 6	41'63	Soil ... 14½	5 14 3
Althán ..	Survey No. 34 (Exp. No. 63).	Gingelly seed .	25 13 3	8 7 8	32'82	Soil .. 12½	5 1 3

The maximum rate taken for Magob, Althán and Bhatár is Rs. 6-8. It is the rate proposed by Mr. Fernandez in his revision settlement proposals. What changes may be made by Mr. Ozanne it is not, at the date of writing, known. The usual small changes will be made for the distance scale. It will be noticed that Magob assessments will be higher, which is right.

Mr. P. R. Mehta, Gujarát Revenue Survey, submits six tests on *Kada* rice taken by him in this taluka. He also gives an account of rice-cultivation in the district, which I shall endeavour to condense after noticing shortly each experiment by itself. Chorási is, as Mr. Mehta observes, not a rice growing taluka. It is unfortunate that the second crops were not tested. I thought I might have time to do them myself, but found it impossible owing to my presence being required in Bárdoli. Of the six fields tested by Mr. Mehta, only two I found to have grown a second crop, in both cases *vál*.

Mr. Mehta gives a table showing the dryage of the rice :—

Village.	Field.	Weight of 80 tolas after drying.
		Tolas.
Kacholi ...	Survey No. 7 (Exp. No. 64)	74
Párdi Rákeb	Survey No. 5 (Exp. No. 65)	74½
Sámrod ...	Survey No. 43 (Exp. No. 66)	76½
Kaphleta...	Survey No. 131 (Exp. No. 67)	75
Talángpor	Survey No. 148 (Exp. No. 68)	73
Páli ...	Survey No. 41 (Exp. No. 69)	70½

His calculations are based on the dry weights thus determined. My own experience shows that the original 80 *tolas* must have been weighed immediately after cutting and threshing. Rice (paddy) does not shrink more than 4 per cent. if the first weighing is made three or four days after threshing. Mr. Mehta has given the weights of the rice straw (*parál*). These are not of much importance, as the straw is never sold by weight but by the hundred bundles or by the cart-load. Mr. Mehta calculates the straw prices at 600 lbs. per rupee. Supposing a bundle to weigh $1\frac{1}{2}$ lb., that gives 4 annas a hundred bundles, which is the rate I myself took. Mr. Mehta only cut 1 guntha bits except in the last test which was on 2 gunthas. So small an area does not give quite trustworthy results.

Experiment No. 64.—The first field (Pot number) measures 28 gunthas and is assessed at Rs. 7-10, of which Rs. 1-12 is for tank water, or Rs. 10-14-3 per acre. The tank appears to be very unsatisfactory. This year there was not enough rain to fill it and it was not used, that is to say, its water is not available when most wanted. The soil is black soil as in all Mr. Mehta's experiments. Seed rate was 137 lbs. per acre. Four cart-loads of manure were put in $2\frac{1}{2}$ gunthas of seed-bed and 12 carts in $25\frac{1}{2}$ gunthas into which seedlings were transplanted. Anna valuation is 10. Grain outturn 1,831 lbs. per acre. Value of produce Rs. 41-1 and incidence 26-52 per cent. A second crop of *vál* or gram has been grown six times out of the last nine years, so that the incidence is fairly light.

Experiment No. 65.—The second field measuring 4 acres 10 gunthas and assessed at Rs. 20-14 or Rs. 4-14-7 per acre was classed as Jiráyat and has newly (in 1889) been converted into rice land. There is no tank. It has grown a second crop of *vál* six years out of seven. The part of the field in which the experiment was made measures 12 gunthas. Forty sheep were folded in it for 10 days and three cart-loads of manure put on. Seed rate was 150 lbs. per acre, possibly an exaggeration. Outturn of grain was 1,533 lbs. per acre and value of gross produce Rs. 34-9. Incidence comes to 14-21 per cent. It must be remembered that this land has been re-classed as rice, and its assessment will be largely increased. (See table of classification and new rates shown below.)

Experiment No. 66.—The third field at Sámrod is also new rice and was assessed as Jiráyat. It also will become rice under the revision survey. It has no tank. It was made into rice in 1891 and has grown a second crop only once since. Thirty cart-loads of manure were applied to 1 acre 38 gunthas. Seed rate is 119 lbs. Grain outturn, 12-anna crop, 1,874 lbs. per acre; gross value of outturn Rs. 42-1-3 and incidence 9-37 per cent.

The next three fields are old rice. The Kaphleta field has no irrigation, the other two (Exp. Nos. 68 and 69) have tank water for which they are both assessed at revision survey as they were at original survey.

Experiment No. 67.—The Kaphleta field has grown a second crop of *vál* four times during the last nine years. It had three carts of manure on the seed-bed of 6 gunthas and seven carts on 1 acre 9 gunthas of the rest of the field. Seed rate was 81 lbs. which Mr. Mehta thinks low. Outturn of grain 1,762 lbs. per acre and gross value Rs. 39-15-0. Incidence 21-46 per cent., the assessment being Rs. 8-9-2 per acre.

Experiment No. 68.—The next field at Talangpor gave a fine yield of rice, 2,975 lbs grain worth, with straw, Rs. 67-5-10. But the crop is only rated at 14 annas. The Pot-number tested measures 6 gunthas. On it 10 *sers san* seed were sown and the plants dug in as green manure. At the end of July the field was top-dressed with one maund of castor cake. *San* seed costs $1\frac{1}{4}$ maunds per rupee and castor cake annas 8 per maund. The *san* was probably produced at home. The crop was not affected by the season owing to the tank protection. Seed rate was 128 lbs. per acre. The acre rate of assessment is Rs. 11-10-8 and the incidence works out to 17-32 per cent. This field has had, as I know, a second crop of *vál* this year. So the incidence must be considered extremely light.

Experiment No. 69.—The field at Páli was only 2 gunthas in size and the whole field was cut. The field received only one watering from the tank under which it is. Mr. Mehta says a second watering was needed, but does not say why it was not taken. Presumably there was not sufficient water in the tank. The field has grown *vál* seven times in the last nine years. Two cart-loads of manure were put on the 2 gunthas, and seed rate was 70 lbs. per acre. Grain outturn, estimated as a 12-anna crop, was 2,115 lbs. per acre; total value of crop Rs. 49-5-8 and incidence 25-32 per cent., acre assessment being Rs. 12-8.

I give here a table showing all these six rice fields :—

Village.	Field.	Gross value of produce per acre.	Assessment per acre (original survey).	Percentage incidence of assessment.	Bhág annas (revision survey)	Assessment per acre (revision survey).
		Rs. a. p.	Rs. a. p.			Rs. a. p.
Kacholi ...	Survey No. 7 (Exp. No. 64).	41 1 0	10 14 3	26.52	*Soil ... 9 Rain water. .7 Tank water. 4	10 3 0
Párdi Rákeb...	Survey No. 5 (Exp. No. 65).	34 9 0	4 14 7	14.21	Soil ... 15 Position ... 2½	6 9 0
Sámrod ...	Survey No. 43 (Exp. No. 66).	42 1 3	3 15 2	9.37	Soil ... 12 Position ... 3	5 10 0
Kaphleta ...	Survey No. 131 (Exp. No. 67).	39 15 0	8 9 2	21.46	*Soil ... 10 Sub-soil ... 4 Rain water. 9	11 13 0
Talangpor ...	Survey No. 148 (Exp. No. 68).	67 5 10	11 10 8	17.32	*Soil ... 9 Rain water. 8 Tank water. 7	12 7 6
Páli ...	Survey No. 41 (Exp. No. 69.)	49 5 8	12 8 0	25.32	*Soil ... 8 Rain water. 8 Tank water. 6	11 5 0

Soil annas on rice lands are doubled for calculation of rates ; thus the annas of the items marked with an asterisk are to be doubled. Where the rice soil annas are above 8 it is owing to the second crop. I have adopted the maximum rates, Rs. 6-8 for soil and Rs. 5-8-0 for water, for rice lands in Talangpor and Páli, and Rs. 6 for soil, Rs. 5 for water for rice lands at Kacholi, Párdi Rákeb, Sámrod and Kaphleta. These are the maximum rates proposed by Mr. Fernandez in his revision settlement proposals.

Rice seed is as a rule sown in June in a seed-bed and transplanted into the permanent field about three weeks after sowing. When rain holds off at the time of transplanting, the crop suffers. Four to eight gunthas of seed-bed are required for one acre of land and transplanting takes 20 to 25 men per acre who receive 2 to 2½ annas a day. The seed-bed has to be weeded† as well as the permanent bed. Rice is occasionally drilled in Jirayát fields generally together with *twer*. When sugarcane is intended to follow, rice is sometimes broadcasted in the permanent bed or *kiári*, as it then matures early and allows of sufficient time to prepare the land for the cane‡. In Párdi§ and Balsár the seedlings are sometimes raised in a rábed bed. But the common practice is for the seed-bed (*taru*) to be simply a portion of the field rather more heavily manured than the rest, in order to force on the seedlings and enable them to be transplanted early. The usual rate of seed for seedlings sufficient to transplant an acre of field is given by Mr. Mehta as 120 lbs. and in my experiments from 90 to 100. There is not the least doubt that the formulæ rate of seed, 30 lbs. per acre, is quite wrong for Surat. In north Gujarát 25 lbs. is sometimes enough. There is a difference both in the rice and in the system of cultivation.

The seed-bed is manured at the rate of one cart-load of farm-yard manure per guntha. When the seedlings are removed, the seed-bed is utilized just the same as any other part of the field. Immediately after the first showers in June the seed is broadcasted. It is then covered up by one or two ploughings. If the seed-bed is hard and foul it may be ploughed before sowing. The manure is spread on in April or May, both on the seed-bed and on the rest of the field (*kiári*). The field is ploughed once or twice in June, and at the time of transplanting the seedlings the operation of puddling (*ghaval* or *kádav pádvo*) is performed. The *kiári* is ploughed while it holds a foot or so of water and is then levelled with an instrument called a *pányu*. There is a traditional saying in the district that *kiáris* should be manured with one cart-load per *vása*|| or 30 cart-loads an acre. But such a large amount is not usually available. Manure is seldom sold. A cart-load could be bought¶ at Re. 1 to Re. 1-4.

† True for unrábed beds, but, as pointed out elsewhere, rábed beds are not usually weeded.

‡ According to my own experience this is usual only in the south of the district.

§ Párdi being, as is well known, geographically a part of the Konkan, the methods of Konkan are, to a large extent, followed there.

|| 3 *vásas* = 4 gunthas.

¶ Only annas 8 in Bidoli and probably most out of the way places. But the fact is that cultivators buy, if they buy at all, a whole heap, and the actual rate comes to much less than annas 8 per cart-load.

Sheep and goats are often penned in *kiáris* at night, the shepherd getting from annas 4 to annas 6 according to the size of his flock per night. Silt from the bottom of a dried up tank is esteemed highly beneficial. When other manure is not available in sufficient quantities, a green crop of *san* is dug in. *San* seed is sown broadcast and the plants ploughed in about three weeks afterwards, at the time of puddling. The chief drawback to this *san* manuring is that when there is too much rain early the *san* may rot and come to nothing; and if the *san* cannot be ploughed in at the right time, it may grow too tall and ripe to be thoroughly broken up and buried in the soil. The effect of this green manure is thought to last only one year, while farm-yard manure improves two successive crops.

Khol or castor cake is often applied as a top dressing a week or two after the seedlings are transplanted if the farm-yard manure was short. It generally costs Re. 1 per 77 lbs. or two maunds.

Fish is used as a manure in Párdi and is applied at the rate of 200 lbs. per acre. It is sold by the basket and comes to 60 to 80 lbs. per rupee. It is generally applied as a top dressing to backward and poor looking crops and is said to produce an excellent effect.

Good *kiáris* will produce 3,000 lbs. of *Kada* rice and perhaps a couple of hundred pounds more of *Kolamb*, *Bangáliu* or *Sukhvel*. A good *kiári* producing 3,000 lbs. *Kada* paddy will bear the following classification annas:—Soil 14 to 16; 2nd crop 4; rain water 6 to 8; tank water 6 to 8.

If it has subsoil water annas as well it probably produces sugarcane once in a three or five years' rotation. The rotation with sugarcane is as follows:—

- 1st year—Rice, sugarcane (*ummed* or just planted).
- 2nd year—Sugarcane (*rasida* or ready.)
- 3rd year—Rice and *vál*.
- 4th year—Rice and *vál*.
- 5th year—Rice and sugarcane.

In superior fields of Uttam Bágáyat, sugarcane is grown every other year; sugarcane one year and a mixed crop of rice, *tuber* and other pulses the next. The land naturally has to be heavily manured. Except the fields which were wrongly classed as Natural Bágáyat, *kiáris* fetch a rent of twice the assessment. Such Natural Bágáyat fields fetch $1\frac{1}{2}$ times the assessment.

Mr. Mehta calculates the cost of cultivation per acre as follows:—

Item.	Amount.		
	Rs.	a.	p.
Manuring 4 to 8 gunthas seed-bed, 3 carts; and 9 carts on the remaining portion at 12 annas a cart	9	0	0
Ploughing, sowing and levelling seed-bed	0	9	0
Cost of seed; 3 maunds at Re. 1 per maund	3	0	0
Ploughing twice the <i>kiári</i> in June	1	12	0
Puddling; ploughing once or twice and levelling (slow heavy work)	3	0	0
Weeding seed-bed	0	4	0
Transplanting; 20 men at $2\frac{1}{2}$ annas each	3	2	0
Top dressing with castor cake; 5 maunds; Re. 1 per two maunds and 8 men to apply it	3	8	0
Weeding <i>kiári</i> ; ten men	1	4	0
Cutting, carrying, beating out paddy and cleaning it; 25 men at $2\frac{1}{2}$ annas each	3	14	6
Treading <i>parál</i> to make <i>púju</i> * and to secure any remaining grain; 4 men and 4 bullocks for 3 days at $2\frac{1}{2}$ annas each	3	6	0
	32	11	6
Add assessment Rs. 15	15	0	0
Total cost	47	11	6
Produce 3,000 lbs. <i>Kada</i> at 12 annas a maund plus straw (at Rs. 5)	63	8	0
Net profit	15	12	6

* The substance which results from the treading of the straw is called *púju*.

There are of course certain obvious criticisms on this scale of charges. Manure costs nothing as a rule, being the produce of milch animals whose keep is more than paid for by the sale of *ghi*. A good deal of the labour is home labour. It ought not to cost Rs. 3-14-6 to gather in the crop. The last operation is not necessary and would not be undertaken unless it could be done much cheaper than Rs. 3-6. For 3,000 lbs. grain would correspond to 3,000 lbs. straw, which is worth, according to Mr. Mehta, Rs. 5 and this is all the value Mr. Mehta allows it after Rs. 3-6 has been spent on it. On the other hand, all fields certainly do not produce 3,000 lbs. grain. Again, there would almost certainly be a second crop which costs hardly anything in such a field as Mr. Mehta supposes.

I turn now to the garden tests taken by Mr. Mollison and myself. Except three experiments on sugarcane at Adájan all the tests were taken at the garden villages of the Kumbhária group—Kumbhária itself or Magob.

Experiment No. 70.—An experiment on *Surti Meva* sugarcane at Kumbhária. The soil is the brown garden soil of this group. The well is an old two-bag well irrigating only this field which measures 2 acres 22 gunthas and is assessed at Rs. 43, which includes Rs. 18 for the well. This year the field has about one acre sugarcane and $1\frac{1}{2}$ acre fallow and to be used for onions. Sugarcane was grown last in 1891-92. Other garden crops are taken. The cultivator is a Kanbi. He says he put on 50 cart-loads manure per acre. About 9,360 pieces of cane were planted. There were 12 to each bed or *kiári* and in one guntha there were $19\frac{1}{2}$ *kiáris*. The crop was planted in February and cut in the following January. This variety of cane is used solely for eating purposes and I shall have more to say about it when dealing with Exp. No. 72. The outturn from one guntha was 940 canes. I estimate their value at Rs. 5 or Rs. 200 per acre, which brings the incidence to 8.43 per cent. The crop was sold, it is about one acre as I have said, to a Koli for, according to the Koli's statement, Rs. 100. The Koli put the price of the lot I cut at Rs. 6 and he would get Rs. 4-8 as he would have to pay 25 per cent. to the broker who sold. The crop was estimated as a 12-anna one. It was not a good one. There were no canes of the first or second class (see Exp. No. 72). There were 240 of the third, 240 of the fourth, 260 of the fifth, 200 of the sixth and a small amount of broken and undersized canes.

Experiment No. 71.—A similar but better crop at Magob, a neighbouring village. The field measures 9 acres 12 gunthas, of which two gunthas are *kharáb* for the well. It is assessed at Rs. 118-8, of which Rs. 66 are for the water, or Rs. 12-13 per acre. It will be seen that about Rs. 6 is for soil and the rest for the well. The field is sublet to four cultivators. Garden produce of all sorts is grown. The cultivators come from the neighbouring Sachin village of Puna. The well is a large one and supplies sweet water plentifully. The water appears to have a fertilizing effect itself; there is probably iron in it.

Of the whole field two pieces, about 2 acres in all, were under sugarcane. The two pieces belonged to two different men. The piece from which I cut one guntha belonged to one Haribhái Ragha, who sold the crop about a month ago to a Dhed for, I was told, Rs. 210. This piece I measured and found it $\frac{1}{2}$ guntha less than one acre. If the figure Rs. 210 can be trusted—such figures are usually below the true amounts—the purchaser must have made a good bargain. The outturn was 47,360 canes an acre valued at Rs. 296. Among the canes were the finest canes of the first class.

Fifty cart-loads of manure per Bigha (23 gunthas) are said to have been applied. The crop is estimated as an average one. The seed rate was 7,200 pieces of cane per acre. Twelve pieces of cane, each about 10 inches long, were put in each square (*kiári*) and there were 15 *kiáris* per guntha.

I did not classify the canes in this bit. The canes were valued at 10 per anna, which is about the average. There is no byproduct worth considering. The dried leaves which are stripped off are used for thatching.

Experiment No. 72.—An experiment on sugarcane on the Bháta lands on the river Tápti opposite Surat in the village of Adájan. There is a fringe of this Bháta land along the northern bank of the river. It is very fine alluvial soil. Without irrigation it grows such crops as brinjals, chillies, &c. When not growing garden crops proper, these alluvial soils grow fine mixed crops of *juvár*, *vál*, *tuver*,

guvār, &c. The *vāl* is especially fine and is chiefly eaten as a fresh vegetable, resembling, more closely than anything else I have tasted, French beans. There are country mangoes in many fields, and date trees in almost all, the latter being tapped for toddy which is largely produced on the north bank of the Tápti. The *ber* or *bor* tree is also common, its fruit being sold at a cheap rate in the Bazár. Unfortunately no other crop but sugarcane can be tested, because an experimenter cannot supervise operations which last for several months. I think it is quite possible that graft mangoes would grow. The Patel told me that there is one garden of them. With irrigation this soil would grow anything. Unfortunately, the water is never sweet. It is sometimes brackish and sometimes salt. There is a great difference between fields with salt and fields with brackish water, and there undoubtedly ought to be a great difference in their classification and assessment. The depth of the water matters very little. It varies considerably at different times of the year and according to the year's rainfall. The assessment on all these fields is very high, for instance, over Rs. 18½ per acre on the field of the experiment. That is to say it is rated much higher than the garden soils of Kumbhária, while the superior productiveness of the latter is, according to my experience, decided, owing to its water.

The field measures 2 acres 12 gunthas. I tested a bit in Pot No. 2 which measures 25 gunthas and is assessed at Rs. 11-10 or Rs. 18-9-7 per acre. Thirty-two cart-loads of farm-yard manure were put on per acre. Seed rate was 9,000 pieces of cane per acre planted in March. Outturn from the one guntha of my test was 983 canes, or 39,320 per acre valued at Rs. 191-1-7. The crop was irrigated from a *kachha* well. Water (brackish) is found about 20 feet below the surface, and it is the practice to dig *kachha* wells. These *kachha* wells frequently fall in, especially in years of heavy rainfall. They cost about Rs. 15 to dig. But occasionally several wells have to be dug before a successful and strong one is got. In this field the first well was successful and besides irrigating the crop of the Pot number tested, it supplies water to the sugarcane of Pot No. 1 (area 21 gunthas) and that planted in Survey No. 13 (area 1 acre 7 gunthas), in all 2 acres 13 gunthas of sugarcane.

The field, Pot number 2, area 25 gunthas, belongs to a Boráh who lets it to a Kanbi for Rs. 20 or Rs. 32 per acre, the owner paying the assessment and Local Fund. When the sugarcane crop was nearly ready it was sold by the Kanbi to another Kanbi for, they say, Rs. 100. This second Kanbi sells the canes in Surat and Ránder, and I shall show presently how they are sold, and the method I have adopted in calculating the value of the outturn. I may remark here that it would be much better if we could find out what the crop is worth to the cultivator. But then I put little trust in the cultivator's statements while I can find out more or less correctly the retail price of the produce. The buyer, the second Kanbi, cuts the cane as he wants it. He cuts about ½ guntha before sunrise and takes it to the Ránder or Surat Bazár.

The cane is known as *Meva* or fresh fruit. It is a thin soft white variety. It is all eaten fresh. *Gol* is not made from it. No *gol*-making cane is grown near Surat; probably fruit cane pays better. The seed canes are brought from the villages of Kumbhária, Puna, &c. They are planted in February or March in dry beds. Only the finer canes are used for seed. Immediately after planting, the field is watered and the crop should be irrigated about once a week in the dry weather and when the rains hold off in the monsoon. It is probably generally irrigated less. This crop was watered four times after the monsoon and before being cut. It has to be twice weeded; once when the plants are about a foot and once when they are 2 to 3 feet high. It should be protected from jackals, which are extremely numerous near Surat. Both jackals and rats (field shrews) do a great deal of harm. Jackals bite through and suck the cane, choosing the finest ones, about a foot from the ground.

In the Bazár there are seven classes of eating cane, the quality depending upon the fineness and thickness of the cane. Their names and prices are as follows:—

I Charat at 3 canes per anna or Rs. 2-0-0 per 100.	
II Pardi at 4 do. or „ 1-8-0 „	
III Bárel at 5 do. or „ 1-4-0 „	

IV Kátro at	7 canes per anna or	Re. 0-15-0 per 100.
V Tol at 10	do. or „	0-10-6 „
VI Avval at	$\frac{3}{4}$ pie each or „	0-6-0 „
VII Duum at	$\frac{1}{2}$ pie each or 3 canes per pie or	Re. 0-3-0 per 100.

The field of this experiment produced neither *Charat* nor *Pardi*. The absence of *Pardi* made the crop only a 12-anna one. *Charat* is never produced here but only at Kumbhária. In the guntha I cut there were 63 *Bábré*, 111 *Kátro*, 200 *Tol*, 264 *Avval* and 345 *Duum* canes. The price of the crop I have calculated on the rates per hundred. According to the retail prices the values are Rs. 4-15-2 for the guntha and Rs. 197-14-8 for the acre.

The rates quoted were given me by a Pársi who bought the crop of the next experiment. He had no motive, but rather the reverse, for giving me rates higher than those actually obtained, and I imagine his rates are correct, at least for Ránder. The Mám-latdár gave me lower rates, viz., Re. 1-8, Re. 1-2, annas 15, annas 9, annas $7\frac{1}{2}$, annas $4\frac{1}{2}$ and annas $2\frac{1}{4}$ respectively per hundred; and my private butler found these rates:—Re. 1-8, Re. 1-4, Re. 1-2, annas 12, annas 8, annas 6, annas 4.

The byproduct I have not valued. It consists of the dry leaves stripped off and may be used for thatching. The tops are not cut off, but the canes are sold with the tops. The incidence of assessment comes to 9·73 per cent., which appears to me very high for such a crop as sugarcane.

Experiment No. 73.—This was a crop and a field very much like the last. The Pot number measures 25 gunthas and is assessed at Rs. 11-12 or Rs. 18-12-10 per acre. It is Bháta Bágáyat like the last, and is also irrigated from a *kachha* well. It grows exactly the same classes of crops. The owner of the field is a Koli. He says he bought the field 15 years ago for Rs. 125 about 10 times the assessment. He has sold the sugarcane crop for Rs. 100 to a Ránder Pársi. I took two days to cut one guntha, cutting half on 6th and half on 10th December. The field besides its crop of sugarcane has 8 mango trees, 4 large date palms (*khajuri*) and 50 young ones; also two *ber* trees. The water applied to the sugarcane has a very beneficial effect upon the young trees. The treatment of the crop was the same as in the case of the last experiment. Forty-eight cart-loads of manure per acre were put on and the seed rate was 9,000 pieces per acre. The guntha produced 816 canes: 37 *Pardi*, 141 *Bábré*, 146 *Kátro*, 130 *Tol*, 177 *Avval*, and 135 below class, probably the same as *Duum*. The crop was as a 14-anna crop and its value, calculated as in the last experiment, was Rs. 227-8; incidence coming to 8·26 per cent.

The cane was damaged a little by rats and jackals and was affected by a kind of blight called *mási*. The blight consists of a black sooty deposit round the joints of the canes and a number of small grey spots on the leaves. It does not appear to matter much.

Experiment No. 74.—A Meva sugarcane experiment by Mr. Mollison at Adájan, similar to the last two, on the alluvial soil “old Bháta land, a very fine description of *gorádu* soil. The land is now only liable to be submerged in years of exceptional floods. The subsoil water throughout the greater part of the garden tract is salt and unsuitable for irrigation, but there is a well defined portion near the river where the water is only brackish, and here irrigated crops are grown. The test field was selected in this area. The water generally gets almost salt in the hot season, and irrigated crops are not continuously grown. Sugarcane is generally taken once in five years. The succeeding year a dry crop is grown, generally it is *juvár* with a subordinate mixture of *tuvér*, castor, *guvár* (*Cyanopsis psoraloides*) and *vál*. The outturn of the mixed crop is much more certain and much greater than that of any crop in ordinary black dry crop soil. Other crops in the rotation are brinjals, tobacco, castor alone, *turia* (*Luffa acutangula*), and *chibdi* (*Cucumis sativus*), the two former generally assisted by light irrigation, the three latter as dry crops. A good many numbers grow grass and *khajuri* trees (*toddy palms). Numerous plantations are now being formed

* Not toddy palms but country date palms. Mr. Mollison errs as the Brab is usually called the toddy palms.

the land between the trees is cultivated with crops named above until the trees are old enough to be tapped."

The field tested measures 1 acre 6 gunthas and is assessed at Rs. 20-8 or Rs. 17-13-3 per acre. *San* was ploughed in as green manure. The land was ploughed and worked; *chibdi* seed was sown but failed. Fifty cart-loads of farm-yard manure were applied to the field, and the land was again worked and made into beds about 600 to the acre. *Sixteen sets were planted in each bed. A *pakka* well irrigates the field; depth to surface of water 27 feet. The field was thickly planted with *khajuri* trees—2 years old.

Mr. Mollison only cut half a guntha, but thinks that the results may be accepted as fairly average for the whole crop if it had been all cut on the same day. The crop was fairly even. The outturn from the piece cut was:—

42 Pardi	at 64	per rupee or Rs. 1- 9-0	per hundred.
85 Bábrel	at 80	„ „ or Rs. 1- 4-0	per hundred.
225 Kátro	at 112	„ „ or Rs. 0-14-3	per hundred.
96 Tol	at 160	„ „ or Rs. 0-10-0	per hundred.

and about 100 odd pieces priced at Re. 0-5-10, the total coming to Rs. 3-12-10. Total number of canes 26,188 and 7,550 odd pieces per acre valued at Rs. 286-4-7. Incidence works out to 6-23 per cent. The prices given by Mr. Mollison are almost exactly the same as those quoted by me. They are wholesale rates.

Mr. Mollison is of opinion, judging from the general appearance of the crops both this year and the last, that the assessment on this land is moderate. But he would "draw a sharp line of distinction between the numbers which have brackish subsoil water and numbers which have absolutely salt water. There is ample evidence that the water over a large area is absolutely salt, because wells have been dug and are not used, and the villagers know or think they know where there is a certainty of getting water suitable (brackish) and unsuitable (salt) for irrigation."

Experiment No. 75.—An experiment on groundnut at Kumbhária. The outturn, 1,206 lbs. per acre of fresh unshelled nuts, is extremely poor; it is not clear why. It is estimated as a 10-anna crop. The field measures 2 acres 35 gunthas plus 1 guntha well *kharáb*, assessed at Rs. 37, of which Rs. 14-13 are for the well, or Rs. 12-13-11 per acre. It grows all sorts of garden crops and fruit trees. The land is said to have been manured with 40 cart-loads of manure per acre. This can hardly be true. Seed rate was 120 lbs. per acre which is three times the formulæ rate and is probably an exaggeration. I have estimated the haulms as worth 3 annas per guntha, and the price of fresh nuts was Rs. 1-8 per Surat maund. Dried nuts fetch Rs. 2-8 per maund. The value of the total produce comes to Rs. 55-2-7 and the incidence to the high figure of 23-32 per cent. Groundnut was sown three years running.

Experiment No. 76.—A groundnut test at the same village by Mr. Mollison. The field, 2 acres 37 gunthas, assessed at Rs. 15-8 or Rs. 5-4-9 per acre, was classed as *Jiráyát*. One acre is under irrigation. In 1891-92 and 1892-93 *juvár* was grown and the last two years groundnut. The cultivator gets water from a neighbour's well and pays Rs. 10 per annum for it. Manure, at the rate of 30 loads per acre bought in another village at Re. 1 per load, was applied according to the occupant, but there was not much evidence of a heavy dressing, and the field was not "cultivated with the care usually bestowed on garden crops. The beds were irregularly formed and far too large for economical watering." Water was given six times. The seed was sown by hand behind the plough in June-July at the high rate of 75 lbs. per acre. Had the seed been planted by hand in pits about a foot apart, as is commonly done in the district, much less seed would have been required. Mr. Mollison allows Rs. 2 per acre for the fodder. The haulms were dead ripe. Still I think the fodder is worth more. The crop was hand-dug with a light pick; expense estimated at Rs. 20 per acre, perhaps too high a rate. This digging is a capital preparation for the next crop. The nuts (in shell but dried) were 1,620 lbs. per acre †worth, with the byproduct, Rs. 75-11-4. The

* It may be noticed that the formulæ rate of 20,000 sets per acre is undoubtedly wrong for this variety of cane. 9,000 to 10,000 is the rate.

† Price Re. 1-12 per maund or Re. 1 to Re. 1-4 newly lifted. A lower rate than that taken by myself.

incidence of assessment comes to 6.99 per cent, and the margin of profit small. Mr. Mollison observes that the owner is bringing his land into condition to grow much more valuable garden crops, and elsewhere he remarks on the custom of taking several groundnut crops in succession.

Experiment No. 77.—This is an experiment on cabbages by myself. The field measures 7 acres 7 gunthas and the Pot number experimented on 1 acre 31 gunthas assessed at Rs. 21-10 or Rs. 12-2-11 per acre. Of the Rs. 21-10 Rs. 13 are for the well. The soil classification was only 12 annas at the original survey—actual rate Rs. 4-13-9. It has been re-classed at 19 annas for soil plus 4 annas for subsoil.

The field grows all sorts of garden crops. Cabbages are found to pay very well. The variety is a coarse medium-sized one, no doubt very hardy. The seed is got from Bombay at Rs. 5-4 per 4-oz. packet, a very dear rate. The 4 ozs. of seed was put in one guntha of seed-bed, and produced cabbages sufficient to plant out one acre. The seed was sown in August. The one guntha was hired in another field for Rs. 5. Three-fourth load of farm-yard manure and $1\frac{3}{4}$ maunds of castor-oil cake costing 12 annas to Re. 1 were put on the seed-bed. When large enough for transplanting, the cabbages are planted out in little beds (*kiáris*). In each bed 18 to 20 plants are put, and there are 15 beds to the guntha. The cabbages have to be watered every 6 days in default of rain. They have to be weeded two or three times, an easy task with a crop of this sort. Between fifty and sixty cart-loads of manure at Re. 1-4 per load were applied to the acre under cabbages, apart from the seed-bed. The water is obtained from a fine 4-bag well. The well supplies three bags with ease and four with a little care. This cabbage crop was cut in the first half of December, and very high prices were got. Of this more later on. All these cabbages were sent to Bombay. The cultivator is one Bhága Lalu, a Kanbi of Puna. Almost all the Magob garden cultivators are strangers from Puna. Nevertheless the village of Puna is heavily in debt to the Ghánchis of Surat; the village debt is estimated at from one to three *lákhs*. Bhága Lalu is in the hands of a Surat Ghánchi named Motia Arji, and Motia Arji has an agent or partner, a fellow Ghánchi, in Bombay.

The cabbages are cut in the morning. They are packed in baskets measuring about 18 inches deep by 2 to $2\frac{1}{4}$ feet broad. In each basket about 6 ordinary-sized cabbages are put. The baskets are got from Surat and cost about one anna each. Bhága Lalu thinks he did a smart thing by getting 18 for a rupee. The morning I was on the field 40 baskets were ready for despatch. They were sent in a cart to Surat and went to Bombay by the midday passenger train. They get to Bombay by nightfall. The railway freight is about $3\frac{1}{2}$ annas per basket, and coolie hire at Surat one pie per basket. They are taken to the station by the cultivator and are despatched by him to the address of the Bombay agent, and the Surat coolies get paid by sending in a bill to the Surat Ghánchi. When the cabbages have arrived at Bombay they are met by the Bombay agent, who pays freight and other expenses and sells the cabbages by auction to the retail dealers in the market. The Bombay agent then writes to the Surat Ghánchi saying that the cabbages were sold for so much and expenses are so much. The Surat Ghánchi credits the cultivator with the excess of sale-proceeds over expenses and commission in his books. The account of the cultivator with the Ghánchi is squared at the Diváli. As the cultivator keeps no accounts himself and as he knows nothing whatever about the price of cabbages in Bombay, one can very well imagine that he and all his tribe are, well, a little involved.

There is some little difficulty about the price. What is the value of a basket of cabbages? The price varies enormously. Mr. Mollison in his experiment (*vide* next test) allows $\frac{1}{2}$ anna per cabbage. But his cabbages came on in February, whereas the present ones were more than two months earlier and the price obtained was at least twice as large. What the cultivator likes to do is to get his crop ready early. What frequently happens is that the seedlings for his early crop are eaten by caterpillars. I made careful inquiries as to the price realized by the cultivator of the present crop, and I put it at 8 annas per basket.

The Ghánchi allows 10 annas in his books* net after paying freight and commission. The price of a basket is one anna and the price of cartage to Surat Station and cooly hire nearly one anna. Using another method of calculation, the price in the Bombay market was Re. 1-4 per Surat maund. Each basket weighs $\frac{3}{4}$ Surat maund. Freight to Bombay is about 3 annas at 8 annas per Bengal maund, which is about $2\frac{1}{2}$ to 3 baskets. The Ghánchi's commission is one anna in the rupee. There are cartage and cooly expenses in Bombay. If anything, 8 annas is under the mark. Calculated at 8 annas per basket of 6 cabbages the value per acre comes to Rs. 829-4-3 and the incidence of the assessment to 1.47 per cent.

Experiment No. 78.—Mr. Mollison took a test on the same crop (cabbages). The crop was planted in November—15 plants in each bed. There were approximately 809 beds per acre; therefore about 12,000 plants were required per acre. In 18 beds measuring 0.89 of a guntha there were a few vacancies and a few cabbages which had not grown so well as the others. There were 258 well-developed cabbages, equal to 11,600 per acre. The crop was even all over the field and there was no doubt that the cultivator would sell at least 11,600 of them per acre. Twelve ripe and average-sized cabbages (hearts only) weighed 55 lbs. The retail price of such cabbages was one anna each in Surat at the time and wholesale half an anna. Half an anna is the rate Mr. Mollison has taken, 3 maunds per rupee. Calculated at this rate the crop was worth Rs. 362-6 per acre and the incidence of assessment comes to 3.53 per cent. The crop was gathered late in February, and its value was of course much less than it would have been earlier in the season. The crop is estimated as a 16-anna one. Eighty loads cattle dung per acre are said to have been put on the land; but Mr. Mollison thinks this probably an exaggeration. Half a pound of seed costing Rs. 10 gives seedlings sufficient for $1\frac{1}{4}$ acre. The field was fallowed during the monsoon, being well ploughed and manured. The occupant admitted that generally cabbages are a very profitable crop, more so than the other irrigated crops he grows. He complained about the price of seed.

Experiment No. 79.—An experiment on yams at Magob. The field measures 3 acres 2 gunthas and is assessed at Rs. 27, of which Rs. 12 are for a well, or Rs. 8-13-8 per acre. There are three varieties of yam or *ratálu* in the district: *Bhusra*, a long variety of nearly equal diameter throughout with red skin and pure white flesh; *Talabdi*, a spindle-shaped red-skinned variety with red-tinged flesh, reckoned a superior sort and sold at Rs. 12 to Rs. 13 a *khandi* of 20 maunds, while *Bhusra* sells at only Rs. 8; *Kamodia*, round, white and of good flavour, if any of these things can be said to have a good flavour.

The area under test, about $\frac{3}{4}$ acre, has been sublet to a Kanbi for a term of 20 years, 12 of which have run. The owner pays assessment and gives the use of the well. The tenant paid down a lump sum of Rs. 175 for the right of occupancy for 20 years. Apparently there is no other payment, though this rent is very little more than the assessment, and cannot, I think, be correct.

The soil of the area tested has been changed by a long course of manuring and irrigation, but is naturally the same as the dry crop land of the village. For some unexplained reason the land had become stocked with *chido*, a sedge and a troublesome weed in irrigated land. So it was fallowed and hand-dug in 1894-95. The *chido* is not yet eradicated and unfavourably affected the crop tested. Yams, however, Mr. Mollison observes, would be less seriously affected than perhaps any other crop, and the deep digging required for the harvesting of this crop would more or less kill the *chido*. Mr. Mollison gives the cost of

* Translation of extract from the Ghánchi's ledger:—

Page 35.

Bhága Lalu of Puna's account, Samvat 1951:

Rs. 2-7	Kártak	Sud	7—2 baskets cabbages.
" 1-6	"	"	8—2 baskets cabbages.
" 2-6	"	"	11—3 baskets cabbages.
" 8-6	"	Vad	2—16 baskets cabbages.
" 11-8	"	"	7—16 baskets cabbages.
" 15-5	"	"	12—26 baskets cabbages.

digging yams out at Rs. 5 for moist soil. The field was hand-dug the previous year and well ploughed in June and is said to have been manured at the rate of 46 cart-loads per acre of cowdung, costing Re. 1-4 per load. After harrowing and levelling the soil was turned up into rounded ridges 4 feet wide and extending the whole length of the field. The irrigation water flowed along the shallow furrows between the ridges. The sets consist of segments of a yam, each set being about $\frac{1}{3}$ lb. in weight. They were planted about 2 feet apart on the ridges, and about 5,440 sets or, say, 1,800 lbs. are required to plant an acre. The owner said he planted 32 maunds at Rs. 35 for the area tested. It is difficult, as Mr. Mollison says, to reconcile the dear rate paid for the seed with the cheap rate at which the produce is valued. It is not always, I should think, necessary to buy seed at this dear rate.

The crop was watered only a few times during the breaks in the rains and at intervals of 12 days after the rains ceased.

The tested area Mr. Mollison considers inferior to the average, but until the vegetable is dug up no one knows how it will yield. The acre yield was 8,061 lbs. valued at Rs. 104-12-8. Wholesale price of this variety 8 annas per maund. Incidence works out to 8.45 per cent. Had the crop been anything like a good one, the incidence would have been much lower. As it is, it is high. If we believe the rates for manure and seed given, the margin of profit is nil.

Experiment No. 80.—This experiment was taken on mixed turmeric and yams (*talabdi ratálu*). The field measures 5 acres 35 gunthas plus 3 gunthas *kharál*. Its assessment is Rs. 33-8-0 for soil and Rs. 44 for water or together Rs. 13-3-1 per acre. The well supplies only sufficient water for half the field, the other half growing dry crops. The irrigated half showed signs of careful cultivation and liberal treatment. This year it was entirely under the tested crops. In 1894-95 it grew groundnut; in 1893-94 chillies, garlic and *dudhi* (*Lagenaria vulgaris*). Mr. Mollison doubts whether the cultivator is quite exact when he says that 150 loads of manure costing Rs. 150 were applied to $1\frac{3}{4}$ acres. The harvesting of the last year's groundnut crop left the soil dug up and thoroughly exposed to the weather during the hot season. In May manure was applied and the land repeatedly ploughed, and laid out with great exactness into beds; 720 per acre. Six sets of yams were planted on the borders of each bed; 4,320 sets, each weighing $\frac{1}{3}$ to $\frac{1}{2}$ lb. per acre. Inside turmeric was planted; 2,340 lbs. to the acre. Each set was planted in a shallow pit and carefully covered—the sets being about a span apart. The crop was said to have been watered 3 times before the rains, 7 times during them, and 11 times afterwards. It was dead ripe on 21st January.

Both turmeric and yams are sold at once uncleaned, and including the old sets. Turmeric fetched Rs. 7 per *khandi* of 20 maunds and *talabdi* yams Rs. 11-8. Cleaned turmeric fetched Rs. 10-8 to Rs. 11, and weighs by test $\frac{11}{16}$ of the weight of the uncleaned article. The largest yams weigh 7 to 8 lbs. each. Total outturn was 13,570 lbs. turmeric worth Rs. 123-7-9 and 6,020 lbs. yams worth Rs. 90, in all Rs. 213-7-9 per acre. Incidence comes to 6.17 per cent.

Experiment No. 81.—An experiment similar to the last. The field measures 9 acres 10 gunthas net and is assessed at Rs. 52-8 for soil and Rs. 66 for water, together Rs. 12-13 per acre. It is Inám and the Inámdár pays a quit-rent of Rs. 27-8 and Rs. 7-6-6 Local Fund. He has sublet the number at Rs. 15 per Bigha, or, say, Rs. 26 per acre, to three partners who have cultivated the land on the above terms for the last 12 years. About $8\frac{3}{4}$ acres are under irrigation from a three-bag well. The cultivation of the field is described as almost faultless. "A large variety of irrigated crops are grown in quick succession, often two crops equally valuable in one year. During the last four years sugarcane, turmeric and yams, cabbages, garlic, onions, groundnut, chillies, ginger and *suran*, (*Amorphophallus campanulatus*) have been grown in different portions of the number and more or less rotated with each other. The area under experiment grew turmeric and yams in 1893-94 and sugarcane in 1894-95. In this field about 2,140 lbs. of turmeric and about 5,700 yam sets were planted per

acre in May. The crop was watered twice before the rains and ten times afterwards. There was evidence that a heavy application of manure had been given, but it is not likely that the dressing was as heavy as that reported, *viz.*, 125 loads per acre, costing Re. 1 per load in Surat. Half of the turmeric and yam area had been harvested early, and a second crop of onions, which promised remarkably well, had been planted. The tested crop was dead ripe on 22nd February." The outturn was 14,842 lbs. turmeric and 9,014 lbs. yams per acre worth Rs. 269-13-2 together. Incidence comes to 4.74 per cent. Both these last crops are estimated at 16 annas.

Experiment No. 82.—White onions on garden land at Kumbhária. The field measures 30 gunthas and is assessed at Rs. 6-8 for soil. A well irrigates this field and another measuring 1 acre 18 gunthas and assessed for soil at Rs. 12-1. The well *kaśar* is Rs. 40-15. The two fields therefore have Rs. 18-9 for soil for 2 acres 8 gunthas plus Rs. 40-15 for the well or an average of Rs. 27-0-9 per acre for soil and water combined. This is astonishingly and unusually heavy and the well must be capable of irrigating much more land. Mr. Mollison says the occupant "is almost an imbecile but nevertheless not a bad cultivator."

The onions followed a rain crop of *kōhlu* (*Cucurbita pepo*). The *kōhlu* was manured with 46 loads of manure per acre. No manure was applied directly to the onions. For four years previously groundnut has been grown. The variety of onion is known as *Dhola* (white). Mr. Mollison proceeds:—"Whole small onions were planted, and each of these either grew into a large single bulb, or, by sub-division, into several medium-sized bulbs. About 1,000 lbs. of small dry bulbs are sufficient to plant an acre. The field was laid out carefully before planting into beds. Small pits were dug in the bed about 6 inches apart. The single small bulbs were planted, one in each pit and carefully covered. Onions planted in this manner would, in due course, if left alone, produce seed, but all flower stalks were removed; therefore as the crop ripened, bulbs were produced. *Dhola* onions, unlike ordinary onions, are lifted comparatively green. Each onion has when lifted a coarse neck and a good deal of green top. The onions are lifted with a small pick. The tops are cut off close to the bulb and are left in the field to rot, having no saleable value." A sample of the onions lost 25 per cent. in weight in 11 days. The field yielded at the rate of 11,836 lbs. dry bulbs per acre, at the wholesale rate of 9 annas per maund, worth Rs. 173-1-7. Incidence works out to 15.62 per cent.

Experiment No. 83.—Sweet potatoes on a light-coloured free working loam (*gorát*). Mr. Mollison says the field is Natural Bágáyat. Its area is 2 acres 35 gunthas and assessment for soil Rs. 22-3 and for water* Rs. 14-13 or together Rs. 12-13-11 per acre. About one acre is uneven waste growing grass and mango trees, not necessarily unprofitable. Before digging the crop appeared good, but was found to be only middling or 14 annas. The land was formed into beds, 12 feet by 6 feet and 24 cuttings were put into each bed (see Exp. No. 25). Manure at the rate of 46 cart-loads per acre was first applied. The crop was irrigated from a well 12 times. The harvesting operation is difficult. Mr. Mollison says that it costs Rs. 20† per acre. He has given this rate for groundnut which is much easier to dig, as the nuts are much closer to the surface than the sweet potato tubers, and women can dig groundnut. When dug out, the tubers are sorted into three sizes. The small size is almost unsaleable and is kept mostly for home consumption. From 2.125 gunthas 291 lbs. large, 109 lbs. medium and 52 lbs. small tubers were obtained or in all 8,509 lbs. per acre valued at Rs. 203-6-10. The rates were Re. 1-2-0, annas 12 and annas 2 per maund. Incidence of assessment works out to 6.32 per cent.

* Natural Bágáyat should not have a separate water rate and this field is probably ordinary Bágáyat.

† Mr. Mollison gave Rs. 5 as the cost per acre of digging yams. It cannot take 4 times as much to dig sweet potatoes. There are more tubers of course, but they do not go so deep in the ground. Probably the one estimate is much too high as the other is too low.

N.B.—Mr. Mollison's figures are the result of actual observation and probably right.
—J. M. Mackenzie.

I add the following table:—

Village.	Field Number.	Crop of test.	Value of gross produce per acre.	Assessment per acre (original survey).	Percentage incidence of assessment.	Bhág annas (revision survey).	Assessment per acre (revision survey).
			Rs. a. p.	Rs. a. p.			Rs. a. p.
Kumbhária ...	Survey No. 183 (Exp. No. 70).	Sugarcane ...	200 0 0	16 13 10	8.43	Soil ... 24	12 3 0
Magob ...	Survey No. 27 (Exp. No. 71).	Do. ...	296 0 0	12 13 0	4.32	Subsoil ... 6	8 11 9
Adájan ...	Survey No. 14 (Exp. No. 72).	Do. ...	191 1 7	18 9 7	9.73	Soil ... 17½	15 0 0
Adájan ...	Survey No. 47 (Exp. No. 73).	Do. ...	227 8 0	18 12 10	8.26	Subsoil ... 4	15 12 0
Adájan ...	Survey No. 27 (Exp. No. 74).	Do. ...	286 4 7	17 13 3	6.23	Soil ... 20	14 4 0
Kumbhária ...	Survey No. 285 (Exp. No. 75).	Groundnut ...	55 2 7	12 13 11	23.32	Soil ... 21	12 3 0
Kumbhária ...	Survey No. 229 (Exp. No. 76).	Do. ...	75 11 4	5 4 9	6.99	Subsoil ... 6	11 9 3
Magob ...	Survey No. 69 (Exp. No. 77).	Cabbages ...	829 4 3	12 2 11	1.47	Soil ... 22½	9 5 6
Magob ...	Survey No. 27 (Exp. No. 78).	Do. ...	362 6 0	12 13 0	3.53	Subsoil ... 6	8 11 9
Magob ...	Survey No. 49 (Exp. No. 79).	Yams ...	104 12 8	8 13 8	8.45	Soil ... 19	9 5 6
Magob ...	Survey No. 35 (Exp. No. 80).	Turmeric and Yams ...	213 7 9	13 3 1	6.17	Subsoil ... 4	8 11 9
Magob ...	Survey No. 27 (Exp. No. 81).	Do. ...	269 13 2	12 13 0	4.74	Soil ... 17½	8 11 2
Kumbhária ...	Survey Nos. 115 118 (Exp. No. 82).	Onions ...	173 1 7	27 0 9	15.62	Subsoil ... 4	11 6 0
Kumbhária ...	Survey No. 285 (Exp. No. 83).	Sweet potatoes ...	203 6 10	12 13 11	6.32	Soil ... 22	12 3 0
						Subsoil ... 6	

Maximum rates are taken, Mr. Fernandez' proposals, at Rs. 6-8 for Kumbhária and Magob, Rs. 12 for Adájan for Bháta. Distance from village scale when applied will of course make a slight difference.

OLPAD TALUKA.

There were eleven tests taken in the Olpad Taluka, six on *juvár* and five on cotton, all by Mr. Mollison. It is a pity that none could be taken on wheat which is largely grown in the west of the taluka. Gingelly seed also might with advantage have been tested, as it is pretty generally grown in the taluka. There is practically no garden land in the taluka—one village on the Tápti and two or three on the Kim have alluvial Bháta soil. Rice, too, is very little grown as the rainfall is not generally sufficient. Three experiments on rice and one on wheat have been recorded before this year.

I propose to deal with the experiments individually first and then to give Mr. Mollison's general observations about the taluka.

Experiment No. 84.—An experiment on *juvár* at Safetabad, a comparatively poor village Mr. Mollison says. The selected crop was as near as possible average for the village. It is estimated at 20 annas. Mr. Mollison thinks this estimate too high. There can be no doubt about it. *Tuver* and *mag* were sown with the *juvár* but came to nothing. The field bore evidence of fairly careful cultivation. It measures 6 acres 8 gunthas and is assessed at Rs. 31-6 or Rs. 5-0-11 per acre. It was manured last in 1893. The rotation is cotton and *juvár*. The soil is black soil, *morat*, supposed to be saltish. The seed rate was the ordinary one, 6½ lbs. for *juvár*, but far above the average for *tuver*—5 lbs. The outturn was 575 lbs. *juvár* and 200 bundles of *kadbi* per acre, valued at Rs. 16-8-5 and the incidence comes to 30.60 per cent. Mr. Mollison does not say who the cultivator is, rather an important point. Nor does he give the kind of *juvár*, although there is a considerable difference between the prices of *Chapti* and *Pirio juvár*. Both are called Deshi and priced at 41 lbs. per rupee. According to the calculations shown by me in Exp. No. 51, *Pirio* is 42 lbs. and *Chapti* 39½ lbs. per rupee. Mr. Mollison gives 32½ lbs. *tuver* per rupee. My price was 33½ lbs. I think Mr. Mollison's price for *kadbi* Re. 1-8 per hundred large bundles, right for Olpad villages some distance from Surat.

Experiment No. 85.—This test was taken on *juvār* at the adjoining village of Másma where the crops, both cotton and *juvār*, were decidedly better than at Safetabad. The *juvār* crop here tested is said to be about average for the village. The local estimate is again the maximum, 20 annas. Again I think this is too high, much too high. The field measures 5 acres 16 gunthas and is assessed at Rs. 30 or Rs. 5-8-11 per acre. It is black soil, the same as the last field. It is said to have been manured for cotton the year before; and Mr. Mollison thinks this probably true as the owner occupies 100 Bighas, of which 25 are under grass and has 2 pairs of bullocks, 8 buffaloes and 3 calves. The field was carefully cultivated and had a fair sprinkling of *tuver*. The *juvār* stood very thick; hence the large number of bundles of *kadbi*. The heads though numerous were small. The seed rate is the same as in the last experiment; 5 lbs. *tuver* seems too much. The outturn was 781 lbs. *juvār*, 42 lbs. *tuver* and 353 bundles *kadbi* per acre worth Rs. 23-13-11. Incidence comes to 23·27 per cent.

Experiment No. 86.—An experiment taken at Saroli which “is popularly believed to be a good village.” Mr. Mollison says the cotton and *juvār* of the village were on the whole quite promising. The owners of the field are Nágara Bráhmans. Its area is 5 acres 9 gunthas and assessment Rs. 32-8. These men own this and three other fields measuring altogether 16 acres and assessed at Rs. 93-8-0; but as the lands are Ját Inám, only pay a quit-rent of Rs. 27. The four numbers are leased by two Anavla Bráhmaṇ brothers for Rs. 118, and *they (the tenants) also pay Rs. 27 Government dues. The brother who cultivates the selected field possesses no cattle or tillage implements, but hires everything. He says he buys manure, but this is doubtful. The field, however, looked carefully tilled. The cultivator says he is in arrears with the rent. The manure rate is said to be 10 to 15 loads per Bigha every other year; the seed rate is the same as the last; the acre outturn 735 lbs. *juvār* and 310 bundles *kadbi* worth Rs. 21-13-1 and the incidence of assessment 23·50 per cent. The anna valuation is given at 20.

Experiment No. 87.—Another experiment at the same village—Saroli. The outturn here is better, but hardly satisfactory for what is styled a 20-anna crop. The better outturn is attributed to the effect of manure. The cultivator says he manures every other year. Mr. Mollison thinks every fourth year. The cultivator is a Kanbi owning one pair of bullocks, 2 buffaloes, one heifer and 2 calves. The field was carefully tilled. The *juvār* was tall, the stalks rather coarse and the heads of grain large and well filled. The crop was level over the whole field. For want of time Mr. Mollison only cut 5 gunthas. The seed rate was the same as above. The outturn was 888 lbs. *juvār*, 24 lbs. *tuver*, and 250 bundles of *kadbi* worth Rs. 26-3-9 per acre and the incidence works out to 20·54 per cent.

Experiment No. 88.—An experiment taken at Ambheta. The eastern portion of the village lies high and grows the cotton-*juvār* rotation. The crops were good and very different to those on the western side which were decidedly poor. The western side is low-lying and the cultivation of cotton is not attempted owing to the water-logged condition of the fields. Rabi crops of wheat or gram take the place of cotton, but none of the crops Mr. Mollison saw promised well. Mr. Mollison continues:—“This year a good many fields failed to grow *juvār* owing to continuous early rain and the cultivators sowed instead late in the kharif season a mixed crop of *tuver*, *tal* and *chibdi* (a sort of cucumber). There were many such fields all with fairly good crops. In these fields, where *juvār* survived the early wet season, the crops had not thriven as they ought to have done owing to scant rain at the end of the season.”

The experiment was taken on a field of the class last mentioned. The owner is an Anavla Bráhmaṇ owning altogether 80 Bighas, some in the west and some in the east. He has 2 bullocks, 3 buffaloes and 2 calves. He hires bullocks and implements for tillage when required. The field of experiment

* I have had this fact confirmed by separate inquiry.

was some distance from the village but carefully tilled. It was said to have been manured with 10 loads for a portion of the field, but Mr. Mollison does not believe it. The crop was average for the poorer side of the village and was estimated as equal to the average crops of former years, that is, 16 annas. Mr. Mollison thinks it over-estimated. I should say there can be no doubt about it. The seed rate was the same as in the former experiments. The outturn I can only characterise as miserable; 313 lbs. *juvâr* grain and 169 bundles *kadbi* worth Rs. 9-12. The acre assessment is Rs. 4-11-11, so that the incidence comes to 48·66 per cent.

The owner sublets some of his land, finding it more than he can manage. Mr. Mollison gives particulars:—

Survey Number.	Area.	Assessment.	Rent received.	Remarks.
	A. g.	Rs. a.	Rs. a.	
121	2 31	15 8	25 0	Good part of the village.
301	1 22	8 0	10 0	Poorer part.
340	1 9	5 12	5 12	"
511	1 8	7 8	10 0	"

The figures indicate that there is too little difference in the assessment of good and bad lands in the taluka, a fact which I believe is pretty generally known.

Experiment No. 89.— There is another *juvâr* experiment at the same village, but taken this time in the better part. The difference in outturn is astonishing. The rotation here is the ordinary *juvâr* and cotton one. The cultivator is a Koli, and a good cultivator "like many of his caste in the district." The field had been well manured by folding sheep and goats in it, the result being seen by the numerous *babhul* seedlings amongst the *juvâr*. Mr. Mollison thinks the estimate of 20 annas correct. "The seed had been sown twice, and as there was no sign of *tuver* even after the second sowing that pulse was separately drilled in September." Mr. Mollison found this *tuver* immature and could not test it, but says it would probably yield well. For the two sowings of *juvâr* 7 *seers* per Bigha of seed were used.

The field measures 6 acres 36 gunthas and is assessed at Rs. 40 or Rs. 5-12-9 per acre. The outturn of *juvâr* was 1,005 lbs. grain and 255 bundles of *kadbi* valued at Rs. 27-11-2 per acre. Incidence is 20·92 per cent.

The next experiments are on cotton—5 in number.

Experiment No. 90.—Cotton at Másma. The crop is said to have been a good one. There were better crops in the village, but the majority were not so promising. The crop, Mr. Mollison says, was probably a fair average of the good villages grouped together in the south-east part of the taluka. He saw many similar fields within four or five miles distance north and west of Ránder and all along the eastern side of the taluka. Mr. Mollison says:—"The field is about $\frac{1}{2}$ mile from the village. It has black soil and grew in 1892-93 cotton in one portion; castor, *tuver* and *tal* in another portion; cotton in 1893-94 and wheat in 1894-95. The field is reported to have been manured this year with 30 loads ordinary manure for 1 acre 30 gunthas. I question the truth of this statement. The occupant is a Koli. He has no family to help him. He hires labour when required. He occupies 24 Bighas, of which 4 are grass. He owns 2 buffaloes, 2 calves and 4 bullocks, 2 of which are young. The crop, estimated locally at 18 annas, yielded 362 lbs. seed cotton per acre worth Rs. 31-6. The incidence, on Rs. 5-5-9 assessment per acre, works out 17·08 per cent."

For seed 10 *seers* per Bigha is the rate given here and in all Mr. Mollison's experiments. This is a high rate.

Experiment No. 91.—Another field in the same village, also held by a Koli. Mr. Mollison says the crop is under average for the village and estimates it at 10 to 12 annas, but says it was about the same as that in many fields of villages in the centre of the taluka north of Másma. The cotton crops within a radius of 3 or 4 miles round Olpád were on an average no better than that of this

field; a fair dressing of manure is probably given occasionally to this field, but none was applied last year. And the question is when the manure was last applied. "The cultivator has two grown-up sons. The holding is about 40 Bighas, all in cultivation. The owner has 4 work cattle, 2 buffaloes, 2 cows and 5 younger animals. The cultivation was only fair, the land being to a certain extent weedy, but not badly so. Cotton and *juvâr* are taken in alternate years." The outturn was 268 lbs. of seed cotton per acre worth Rs. 23-3-7. The incidence, on Rs. 5-14-7 per acre assessment, works out to 25·45 per cent.

Experiment No. 92.—An experiment at Saroli. The field was specially selected by Mr. Mollison as a first class crop. The land had been under grass and was broken up for cultivation five years ago. The fertility of the field is therefore at present much greater than that of fields long under cultivation and manured inadequately. Mr. Mollison thinks the outturn represents what good black soil is capable of producing "if liberally manured and periodically fallowed." The field was said to have been manured, but Mr. Mollison doubts anything more than a very light dressing. The present cropping is the *juvâr* and cotton rotation. The cultivators are a *Koli* family of five brothers owning 25 Bighas, 2 bullocks 1 buffalo, 1 cow and 2 calves. The crop was estimated at 20 annas. It yielded 575 lbs. per acre of seed cotton worth Rs. 49-13-4, and the incidence on assessment, Rs. 6-0-9 per acre, comes to 12·13 per cent.

Experiment No. 93.—The other Saroli field may be taken, Mr. Mollison says, like the field of Exp. No. 90 as an average one for the better Olpád villages, and for Saroli itself. The occupant again is a *Koli*. He and his three sons work the holding of 38 Bighas and own 2 pairs of bullocks, 3 buffaloes and 1 cow. The field is occasionally manured, but nothing was applied last year, and we do not know how long it is since it was applied. The field measures 5 acres 6 gunthas and is assessed at Rs. 36-8 or *Rs. 7-1-5 per acre which is a high rate. The rotation is cotton and *juvâr* with occasional crops of gingelly seed and *tuver*. The cultivation is described as good and the anna valuation 16. The outturn was 352 lbs. seed cotton and the incidence comes to 23·23 per cent.

Experiment No. 94.—The last cotton test was taken at Ambheta. The condition of the village lands is described in Exp. No. 88. The selected crop is said to have been about the average for the village, but above the average of ordinary years. It was estimated at 18 annas. The manure applied is said by the cultivator to have been 35 loads for 3 Bighas, but this is, as Mr. Mollison says, unlikely. Some was, however, applied and the cultivation was careful, the field being quite free from weeds.

The field measures 4 acres 27 gunthas and is assessed at Rs. 24 or Rs. 5-2-2 per acre. The outturn was 327 lbs. seed cotton per acre worth Rs. 28-5-8 and the incidence works out to 13·11 per cent.

The six *juvâr* tests give an average outturn of Rs. 20-15-8 and incidence of assessment 26·30 per cent. The five cotton tests give an average outturn of Rs. 32-10-6 and incidence of assessment at 18·08 per cent. Taken together the average outturn of the rotation comes to Rs. 26-13-1 and percentage incidence of assessment 22·20. It should be noted that among the *juvâr* tests was one very bad crop and among the cotton tests one very good one.

Previous tests on rice by Mr. Kotvâl in 1892 showed low incidences, and an inferior crop of wheat by Mr. Umedrâm Ranchhoddâs in 1890 showed an incidence of 21·96 per cent.

I give a table for this year's tests.

* The maximum rate for Saroli was Rs. 6-8. The fact that the assessment is actually considerably higher than the maximum, is explained by the great license which Mr. Shambhu Prasâd, the former Settlement Officer, allowed himself in the application of the distance from village site sale.

Village.	Field.	Crop of test.	Value of gross produce per acre.	Assessment per acre (original survey).	Percentage incidence of assessment.	Bhāg annas (revision survey).	Assessment per acre (revision survey).
			Rs. a. p.	Rs. a. p.			Rs. a. p.
Safetabad ...	{ Survey No. 10 (Exp. No. 84) ...	{ Juvār ...	16 8 5	5 0 11	30.60	Soil 12½	4 11 0.
Másma ...	{ Survey No. 73 (Exp. No. 85) ...	{ Juvār, &c. ...	23 13 11	5 8 11	23.27	Do. 14	5 4 0.
Saroli ...	{ Survey No. 93 (Exp. No. 86) ...	{ Juvār ...	21 13 1	6 3 6	28.50	Do. 14½	5 14 3.
Saroli ...	{ Survey No. 64 (Exp. No. 87) ...	{ Juvār, &c. ...	26 3 9	5 6 3	20.54	Do. 12½	5 1 3.
Ambheta ...	{ Survey No. 324 (Exp. No. 88) ...	{ Juvār ...	9 12 0	4 11 11	48.66	Do. 13½	5 1 0.
Ambheta ...	{ Survey No. 280 (Exp. No. 89) ...	{ Juvār ...	27 11 2	5 12 9	20.92	Do. 14½	5 7 0.
Másma ...	{ Survey No. 78 (Exp. No. 90) ...	{ Cotton ...	31 6 0	5 5 9	17.08	Do. 14½	5 7 0.
Másma ...	{ Survey No. 160 (Exp. No. 91) ...	{ Cotton ...	23 3 7	5 14 7	25.45	Do. 14	5 4 0.
Saroli ...	{ Survey No. 107 (Exp. No. 92) ...	{ Cotton ...	49 13 4	6 0 9	12.13	Do. 15	6 1 6.
Saroli ...	{ Survey No. 75 (Exp. No. 93) ...	{ Cotton ...	30 8 1	7 1 5	23.23	Do. 15½	6 4 9.
Ambheta ...	{ Survey No. 225 (Exp. No. 94) ...	{ Cotton ...	28 5 8	5 2 2	18.11	Do. 13.	4 14 0.

The rates proposed by Mr. Ozanne for revision survey are taken. They are for Saroli Rs. 6-8 and for Másma, Safetabad and Ambheta Rs. 6. There has been no change in the classification and the old rates are to be kept. The figures in the last column therefore show what the old rates would have been had there been no old distance scale. They will be slightly changed by the new distance scale.

Mr. Mollison has something to say about the condition of the agriculture and the cultivation of the Olpád taluka. He says:—

“Throughout the taluka this year there are remarkable differences between the *juvār* crops of different villages and to a less extent in the same village. I believe that the same differences exist every year. Some fields are badly cultivated and grow poor crops owing to the occupants being of an inferior cultivating class; but the inferiority of crops is, I think, largely due to poor and impoverished soil and because many fields after heavy rain are water-logged. *Juvār* crops of the taluka are this year generally poorer than those of Chorási, except perhaps between Sáyan and Amroli and between Sáyan and Saroli. In the eastern section of the taluka the villages which have good *juvār* crops this year have also good crops of cotton. In other parts of the taluka the cotton even in the poorer villages is distinctly more promising than the *juvār*. In many villages on the western side of the taluka, wheat takes the place of cotton. This year owing to the scant late rainfall there is not sufficient moisture in the soil to ripen the wheat properly, and I fear the outturn will be disappointing. In the “wheat” villages *juvār* also is comparatively a poor crop, particularly in low lying water-logged fields. The *juvār* in such fields had to be sown more than once, and where it failed after repeated sowings, *tuver*, *tal* and *chibdi* (cucumbers) were sown seasonably midway between kharif and rabi seasons, and this mixed crop promises exceedingly well; but as it is a mixed crop ripening at various seasons it is almost impossible to test it. It would undoubtedly be advantageous if a mixed crop of *tuver* and *tal* took its place regularly in the rotation of the wheat villages. *Juvār* and wheat grown alternately is a very bad combination. *Tuver* and *tal* as a mixed crop would exercise an ameliorating and renovating effect which would be particularly beneficial in those villages where the people are poor, where cattle are scarce, and where manure is exceedingly scant. I fear these conditions are not uncommon throughout the greater portion of the taluka. For obvious reasons, the cultivators give a very exaggerated estimate of the quantity of manure,

applied to fields selected for test. I do not believe their statements neither in respect of manure applied nor of tillage given. I can hardly believe that manure is ever bought for purely dry crop land. The number of cattle owned is a fair guide to the quantity actually available. A cultivator who owns milk buffaloes as well as a sufficient number of work cattle grows decidedly better crops and has his land in much better condition than a less well-to-do man.

"The season was favourable except in low lying water-logged fields. The heavy early rains destroyed early sown crops in such lands, and even second and subsequent sowings did not succeed."

"In Chorási the cotton crops are much more level than in Olpád. In the latter *táluka* cotton is grown only in the good villages and in the higher lying fields of such villages as are liable to be water-logged during heavy monsoon rain. Therefore cotton rotated with *juvār* occupies the best of the black soil of the *táluka*. The cotton crops in this class of land ought to be equally good with those in Chorási if the cultivation in both the *tálukas* was equally good or equally bad. On an average the cultivation is better in Chorási than in Olpád. The agricultural population in Olpád is, I think, generally poorer than in Chorási, and I believe that a larger cotton-*juvār* area per pair of bullocks is cultivated in Olpád than in Chorási. Olpád cultivators, I believe, own fewer breeding cattle on an average than Chorási cultivators do and in consequence the available manure supply of Olpád is less for the dry crop area than that of Chorási. I feel sure that the inherent fertility of the Olpád black dry crop land, except in the good villages, is of a considerably lower level than that of Chorási. In all likelihood the disparity is likely to increase. The Olpád agriculturists are in the worst villages, undoubtedly poor, and even a succession of good seasons would not help them much. Increased profits would go to the *Sávkár* or be expended in marriage festivities or other celebrations. I think it is likely that better crops of *juvār* and of cotton were produced in the Olpád black soil at the time of the original settlement than are now produced. There is nothing to prove that the natural fertility is declining, but it stands to reason that such is the case, because manure is rarely, if ever, bought for dry crop land, and it is only a mere fraction of the produce which is fed to the owner's cattle and a still smaller fraction which finds its way back to the soil as manure. The whole cotton produced is sold, seed as well as lint. All grain, except what is consumed by the owner and his family, is sold. A very considerable proportion of the *juvār kadbi* is also sold, Surat being a very good market for *kadbi*. It is true that a good deal of manure, both poudrette and cattle manure, is bought in Surat by agriculturists, but this manure does not go to the cotton-*juvār* fields. It is used entirely for the market gardens of the neighbourhood. In fact, this town supply is inadequate for the extending cultivation of garden crops, and village manure, which ought to go legitimately to the cotton-*juvār* fields, is sold to the market gardeners and sugarcane growers at a high price, Re. 1 per cart-load. The above is not intended as a plea to lower the assessment on those Olpád villages where the burden of assessment bears heaviest. It is rather intended to indicate one reason why the burden does bear heavily, as it undoubtedly does, in some villages."

There can be no doubt whatever as to the truth and the importance of the main fact which Mr. Mollison has so clearly pointed out. Year after year crops of *juvār* and cotton are taken from the black soil land, and little, if any, return is made. Productiveness must decrease and in thickly populated countries sooner or later this must be felt. And it is probably already being felt not only in Olpád, but in Chorási as well. But I cannot help thinking that Mr. Mollison has seen the best of Chorási and only the medium part of Olpád. The parts of Chorási near Surat—Kumbharia, Magob, Adájan, Bhathár, even Althán—are the finest parts of the *táluka*. On the other hand, Safetabad, Masma, and Ambheta are far from being in the best part of the Olpád *táluka*, and indeed Ambheta may almost be classed among the worst villages. Camping at Sáyan I saw the east of the *táluka* and I was astonished at the fineness of the *juvār* between Sáyan and Kudsád, and the whole of one-third of the *táluka* on the east had excellent crops. I have never seen finer *juvār* than that between Sáyan and Kudsád, neither at Magob nor in the Jalálpor and Bárdoli *tálukas*. It is a great pity that no tests could be taken from these villages.

Then again there is no doubt that in many villages the Olpád cultivators do not equal in skill and care the men of Chorási. There are many Koli villages in Olpád, and, though these men are not anything like such poor cultivators as they are often taken to be, they do not usually equal the Kanbi or the Anavla. The cultivators in Olpád Kasba itself and several other villages are Musalmáns and they have said to me that they do not pretend to be cultivators, they are sepoys.

The anna estimate given by Mr. Mollison for his tests is everywhere high. There is no doubt that Safetabad, Másma and Ambheta did not have anything like a 16-anna crop as a rule this year. Two-thirds of the táluka on the western side suffered from the unusually scanty rainfall. In the matter of rainfall requirements, the táluka is divided into two very well-marked divisions with a broadish border line between them. On the east a heavy rainfall is destructive to the *juvár* and to a smaller extent to the cotton. Many fields are water-logged. This year's scanty rainfall suited that portion. On the west a heavy rainfall is beneficial and indeed for good crops necessary. This year the crops were very poor through lack of rain. I was told everywhere that the crops were 8-anna crops.* Between these two halves runs a strip which may suffer from too much or too little rainfall. This year it undoubtedly suffered from too little. In this strip are Safetabad and Másma and Saroli.

BALSA'R TA'LUKA.

In the Balsár táluka there were 18 experiments taken, 3 on grass by Mr. Mehta, 7 on rice, 6 on second crops following rice, 2 by Mr. Pránlál and the rest by Mr. Mehta, and 2 on sugarcane, one by Mr. D'Souza and one by Mr. Mehta. There have been 13 experiments done in the táluka in previous years which will now be found very useful for comparison.

The re-classification of the táluka has not been yet done. In considering the rice experiments it is important to remember here, as elsewhere, that the season was below the average, especially for the second crop. It will be noticed how very low all Mr. Mehta's anna estimates for the second crops are. I am not at all sure they are too low.

Experiment No. 95.—Grass at Málvan. Mr. Mehta gives very meagre details of these grass experiments. He nowhere even states what sort of grass it is that he has in the three experiments tested. He prices the grass of this and the next test at Rs. 7 per thousand bundles. The area of the field is 24 gunthas and its assessment 13 annas or Re. 1-5-8 per acre. The acre outturn, estimated as an average or 16-anna crop, was 1,024 bundles or 1,400 lbs. valued at Rs. 7-2-8. The incidence comes to 18·89 per cent. The season was favourable, the late showers in October being very beneficial. The field was let out at a rent of Rs. 2-8 for the grass. Mr. Mehta says the occupant pays the assessment. It is not clear what he means by the "occupant;" a reference has elicited the fact that the superior holder pays.

Málvan belongs to group IV, with a maximum dry crop rate of Rs. 3.

Experiment No. 96.—Grass at Vásan, which like Málvan, is a village of the 4th class. The field appears to be a very large one, 10 acres 28 gunthas assessed at Rs. 14 or Re. 1-4-11 per acre. The outturn, 16 annas, is 1,352 bundles or 1,688 lbs. per acre valued at Rs. 9-7-5, and the incidence comes to 13·82 per cent.

Experiment No. 97.—Another grass field at Vásan measuring 1 acre 1 guntha and assessed at Re. 1-4 or Re. 1-3-6 per acre. Outturn 1,600 small bundles or 1,384 lbs. valued at Rs. 8 or Rs. 5 per thousand, and the incidence comes to 15·23 per cent.

The only expenditure on grass lands is the labour of cutting, tying up, watching and carting away the grass. Mr. Mehta says: "Grass is kept three days in the field to dry after it is cut; $\frac{1}{4}$ anna is paid for cutting 24 *koliás*. A *kolia* is equal to 3 handfuls, and a handful of grass is as much as can be retained in the left hand while cutting. About three *koliás* make one *pulli* or bundle.

* That was because I was acting as Assistant Collector and when I was not taking crop experiments, which makes a difference.

Tying is paid for at the rate of $\frac{1}{4}$ anna for 75 *pullis* or bundles. Thus in the case of Exp. No. 95 at Málvan there were

					Rs.	a.	p.
cut 690 <i>kolias</i>	...	...	...	...	0	7	2
and tied 256 <i>pullis</i>	...	...	...	...	0	0	10
Total for 10 gunthas					0	8	0
For 1 acre					2	0	0

Grass lands lightly assessed pay very well indeed. Besides grass there may be *bábhul* or date palms or palmyras, all of which yield a considerable return for practically no expenditure. Málvan is well known for its toddy. Toddy from Málvan is taken as far as 30 miles in the day and the tree tax amounts to Rs. 14,000. Not only so, but many trees are taxed at reduced rates when belonging to Káliparaj owners who tap their trees for their own private consumption.

I may mention that the Málvan and the second field at Vásan were classed at the original survey at 7 annas and the first Vásan field (Survey No. 155) at $7\frac{1}{2}$ annas.

Now I turn to the rice tests.

Experiment Nos. 98 and 99.—Rice at Gundláv followed by *vál*. The field measures 1 acre 34 gunthas and is assessed at Rs. 26 or Rs. 14-0-10 per acre. Maximum rates at present for this village (group III) are for soil Rs. 4 and for water Rs. 10-8. The field might possibly have been assessed at Rs. 19-12.

The rice is *Kada*. The outturn was according to Mr. Pránlál 1,166 lbs. dry paddy and 1,452 lbs. of dry rice straw valued at Rs. 27-11-2. The anna estimate given is 7. Seed rate 130 lbs. per acre. The cultivator was a Káliparaj man and the cultivation was indifferent, there having been no proper weeding. Ten loads of manure on 1 acre 34 gunthas were given. The field is said to have been leased by the owner to the Káliparaj man. Rent is not stated.

The second crop was *vál*, estimated as a 13-anna crop. Seed rate is 50 lbs. per acre. Outturn 753 lbs. pulse per acre worth, with 540 lbs. *gotar* or leaves, husks, sticks, &c., Rs. 16-3-5. The total value of the double crop is Rs. 43-14-7 and incidence on the same 32-00 per cent. which is high. But as the season was bad and the cultivation poor, there is really nothing to complain of.

I do not regard this double experiment as quite satisfactory. Mr. Pránlál gives the most meagre details about the crop itself, but writes at length about the precautions he took and how the rice was cut and taken to the Mámlatdár's *Kacheri* and subsequently dealt with. Most of the rice in the village was cut before the experimenter could get to the spot. It is clear also that the crop was not an average one. The land was leased by the owner to another. Mr. Pránlál might have found out the rent.

Mr. Pránlál quotes *Kada* at $45\frac{1}{2}$ lbs. per rupee. This rate is, I am confident, too high. Mr. D'Souza gives for Balsár $50\frac{1}{2}$ lbs. which corresponds to 12 annas per maund, and which I know is the same as in Jalálpor and Bárdoli and Surat (allowing for municipal taxes). Then again Mr. Pránlál states that he kept 5 *sers* of grain and found it lost half a *ser* by dryage, and in making his calculations has assumed that rate of dryage. This comes to 10 per cent. and is, I am sure, too high; and $4\frac{1}{2}$ *sers* seems probably not an exact figure. The suspicion remains that proper care was not taken. Again for *vál* Mr. Pránlál quotes the price as $57\frac{1}{2}$ lbs. per rupee in Balsár and $45\frac{1}{2}$ lbs. in Chikhli, while Mr. Mehta gives $57\frac{1}{2}$ lbs. at Chikhli; $57\frac{2}{3}$ lbs. was the rate I took at Jalálpor and Bárdoli and is probably the correct rate, approximately, throughout the district. As for the anna estimate, Mr. Pránlál writes:—"7 in a rupee of 16 annas." The meaning of this remark is hardly clear, but as Mr. Pránlál enters 18 as the anna estimate in one of his experiments, it appears that his maximum is 20, which is the standard adopted by Government. The *vál* crop was cut and threshed by Mr. Mehta. The 540 lbs. of byproduct includes stalks which are worthless except for fuel. Supposing that there were 350 lbs. *gotar* or leaves and husks useful as fodder, its valuation at Rs. 3-2-0 is rather high, less than 3 maunds per rupee. I should be inclined to value the rice at Rs. 25-8 instead of Rs. 27-11-2 given by Mr. Pránlál. The incidence would then come to about 34 per cent.

Experiment Nos. 100 and 101.—Mr. Pránlál's second experiment on rice, *Vánkvel*, and a second crop of *vataṇa* (*Pisum sativum*) was made at Nandávla.

The field measures 2 acres 26 gunthas and is assessed at Rs. 21 or Rs. 7-14-10 per acre. The soil is *káli besar*, a light variety of black soil. The anna estimates here are 12 for rice and 8 for *vatána*; and seed rates were 141 lbs. and 55 lbs. respectively. About 50 loads of manure are said to have been put on the whole field including the rice seed-bed which was in the field. The season for this field is said to have been fair "owing to the rainfall being scanty, as the soil is of such a nature that no rice can grow if the rainfall is heavy." Mr. Pránálál does not explain how this is. The cultivation of the rice is described as good and of the *vatána* as indifferent. Mr. Pránálál explains no further. The outturn is 1,974 lbs. rice and 631 lbs. *vatána* per acre. These with their byproducts are valued at Rs. 50-8-8 and Rs. 23-9-11, in all Rs. 74-2-7, and the incidence of assessment on the double crop comes to 10·69 per cent.

The remarks here, too, are most meagre. Rice, *Vánkvel*, is valued at 43 lbs. per rupee and *vatána* at 32 lbs. Both these rates appear to me very high, especially the latter. Mr. D'Souza gives $47\frac{1}{2}$ lbs. per rupee for *Vánkvel* rice and that is probably nearer the truth.

Nandavla is a village of group III; rice lands have maximum rates of Rs. 4 for soil and Rs. 10-8 for water—the same as Gundláv.

Experiment Nos. 102 and 103.—Experiments at Dhamdáchi on rice, *Vánkvel*, by Mr. D'Souza and *vál* by Mr. Mehta. The latter officer deserves much credit for the way in which he has managed to test numerous second crops on fields where the rice has been taken by other experimenters. Of the two crops rice and *vál* the former is far the easier to test. The field measures 1 acre 21 gunthas and is assessed at Rs. 20 or Rs. 13-1-10 per acre. The soil is *káli besar*. The cultivation is described as good, and the anna estimate for rice is given as 16; 151 lbs. of seed per acre were used, 6 gunthas of seed-bed (*rohium*) being allowed for the $1\frac{1}{2}$ acre of field. The seed-bed was manured with 6 loads of manure and was once weeded. The rest of the field is said to have been manured with 30 loads of manure and 150* sheep were folded on it for about a month, the shepherd being allowed in return to graze his flock on the Khátédár's Jiráyat land of about 100 acres.

Mr. D'Souza gives in each of his rice experiments the number of labourers employed. As these statements cannot in each case be satisfactorily proved, I omit them as a rule for the individual tests.

The field is under a tank for which there is a *himávat* rate of Rs. 6-0-1 for the whole field, which figure is included in the assessment. Mr. D'Souza further says: "This number was assessed at original survey to Bágáyat *kasar* of Rs. 17-14 which was remitted by Government Resolution No. 7713, dated 27th September 1884, and Commssioner N. D.'s No. 362 of 29th March 1890, as the well fell into disrepair and supply of water failed."

The field is said to have been watered by gravitation and as the scanty rains hardly filled the tank, its water-supply was insufficient.

The *vál* was sown broadcast at the rate of 60 lbs. per acre. Its outturn, reckoned a 4-anna crop, came to 207 lbs. of pulse. The rice came to 2,025 lbs. grain and 3,120 bundles. *Vánkvel* rice is priced by Mr. D'Souza at $47\frac{1}{2}$ lbs. the rupee. *Vánkvel* rice is a finer variety than *Kada* and ripens some ten days later. *Vál* is priced by Mr. Mehta at $57\frac{1}{2}$ lbs. per rupee, *vál* leaves, *gotar*, at 150 lbs. per rupee, and *vál* stems and stalks at 40 lbs. per anna. Mr. D'Souza does not satisfactorily value the rice straw. He says it is worth Rs. 3 per acre in Balsár and Párdi and Rs. 6 per acre in Chikhli. It is obvious that the yield of straw varies immensely per acre. Mr. D'Souza says it is commonly held to be worth Rs. 3 per acre. That may be so. But what we want to know is what each field tested actually yielded. To carry Mr. D'Souza's principle a little farther is to do away with any need for crop experiments at all. It would be sufficient to say that the yield of rice is commonly held to be $1\frac{1}{2}$ to 2 maunds per guntha. On reference Mr. D'Souza refuses to give any other valuation and says the valuation of rice straw must be "theoretical." It has to be rough, but why theoretical I do not know. I think it is better to value the straw at 1,000 bundles per rupee. It is sold by the cart-load and about 1,000 bundles go to

* This appears to me very liberal treatment.

the cart-load, which is sold at Re. 1. At this valuation the rice outturn is worth Rs. 45-12 and the *vál* Rs. 4-13-9 per acre or together Rs. 50-9-9, and the incidence of assessment comes to 25·91 per cent.

Experiment Nos. 104 and 105.—Experiments at Chikhli on rice, *Kada*, by Mr. D'Souza and *vál* by Mr. Mehta. In the rice experiment the seed-bed was rábed, the ráb materials being 2 cart-loads of cattle dung weighted down with 2 cart-loads of sweepings. The bed was prepared in a part of the field and was $3\frac{1}{2}$ gunthas in area and the quantity of seed was 60 lbs., giving an average of 7·8 gunthas and 141·2 lbs. per acre. The seedlings were not transplanted till August owing to a long break in the rains and the yield is said to have been affected thereby. The whole field (Pot number) measures 17 gunthas and is assessed at Rs. 6-6; of which Rs. 2-3-8 is for tank *himáyat*, or Rs. 15 per acre. The soil is *káli besar* and the cultivation is described as good. The field itself was lightly dressed with $1\frac{1}{2}$ cart-loads of manure. There was at the first break in the rains a preliminary ploughing, and half a maund of *san* seed was broadcasted. Early in August the *san* was ploughed in and the field puddled at the same time by two ploughings and a levelling. The seedlings were then transplanted. The field was once flooded in October. The yield of rice, estimated as a 12-anna crop, was 1,651 lbs. per acre and straw 2,580 bundles. The value* comes to Rs. 35-4-6.

The *vál* was a poor crop, 5 annas. The seed, 40 lbs. per acre, was drilled. The outturn was 286 lbs. pulse and 105 leaves, &c., and 160 lbs. stalks valued at Rs. 5-14-9. The total value of the two crops comes to Rs. 41-3-3 and the incidence works out to 36·40 per cent.

Mr. Mehta gives the following interesting note on *vál* :—

“It forms with rice, *nágli* or *juvár* bread the staple food of the people of the Káliparaj races. It is generally eaten boiled by the poor. The well-to-do make various preparations of the *vál* pulse. *Vál* fodder of course is a valuable addition to the food of the cattle.

“There are many varieties of *vál*. That grown as a second crop in rice lands is a bitter variety called *kadva vál*. The *Surti* or *safed* white *Pápdí* produces sweet *vál*. This is grown more as a garden crop, and over the hedges round almost every household are seen climbers of *Surti Pápdí*. The *Pápdí* or pods in their tender stages are relished as vegetable by all classes of natives. In the rich garden soils a variety of *vál* is grown which is also bitter in taste. It is drilled along with rice, *tuver*, &c., in the months of June and July and is harvested in February. Its pods are smaller than those of the bitter variety described above. There is a fourth variety which is not grown much. Its seed is of the size of double beans.

“*Vál* is a tender crop and is subject to various diseases. The seedlings fall a prey to a caterpillar called *Kámalia*. These caterpillars resemble in appearance those which appear in large numbers on every housestep, wall, &c., during the monsoon, but attain a much larger size. If the crop escapes from the ravages of *Kámalia* it might be damaged† by a few severely cold nights in the month of January. Warm cloudy weather at the time when the plants are in full bloom, has a tendency to cause shedding of the flowers, thus reducing the yield of beans very considerably. In the mature stage an insect pest attacks it. The disease is called *Chikta*. The whole plant is covered with innumerable white minute insects. There are hardly any beans to be seen, but the leaf growth is abundant, producing a large quantity of fodder, which, however, is not of much value, being spoilt by the attack of the insects. If through some cause or other there is a delay in sowing the seed, the opportunity is either lost, as the land soon becomes too hard for sowing, or if sown at all the yield‡ is considerably reduced.

* I calculate straw in Balsár taluka not at Mr. D'Souza's rate of Rs. 3 per acre, but at Re. 1 per thousand bundles. The remark applies to all the Balsár experiments.

† In the Bárdoli taluka I was told that one of the reasons for sowing *san* round the edges of *vál* fields was that the tall *san* plants might help to protect the *vál* from frost.

‡ Compare my experiments on rice at Puni, taluka Bárdoli, and the remark there about the second crop of *vál*.

"*Vál* is sown broadcast at the rate of 60 lbs. of seed per acre, or, as is more* generally the case, drilled by means of the plough at the rate of 40 lbs. per acre. Rarely a good crop is produced by simply dropping the seed in cracks and doing nothing to the soil afterwards. This is only possible in fields which retain a lot of moisture in the subsoil while the surface soil cracks immediately after the rainfall."

Experiment Nos. 106 and 107.—Experiments at Sarodhi on rice, *Kada*, by Mr. D'Souza and *láng* by Mr. Mehta. The Pot number tested measures 18 gunthas and is assessed at Rs. 8, including Rs. 4-2-2 for tank *himáyá*, or Rs. 17-12-5 per acre. The soil is *káli besar*. The anna rate is 10 for rice; the cultivation good. Seed rate was 145 lbs. per acre in 9·3 gunthas† of seed-bed. The actual seed-bed measured $3\frac{1}{2}$ gunthas in extent. It was manured with 4 loads of manure, and the remainder of the field, $14\frac{1}{2}$ gunthas, was dressed with 6 loads. The tank was not used, as there was not enough water in it. The rice outturn comes to 1,213 lbs. per acre and 1,700 bundles of straw, which is very low.

Mr. Mehta estimates the *láng* as a 9-anna crop. Thirty-five pounds of seed per acre were drilled. The outturn was 441 lbs. pulse, 377 lbs. leaves, &c., and 103 lbs. stalks worth Rs. 10-13-11, *láng* being valued at 50 lbs. the rupee, leaves, &c., 200 lbs. the rupee and stalks 40 lbs. per anna. *Láng* fodder is only half the value of *vál* fodder.

The value of the rice crop comes to Rs. 25-11-11 and with the *láng* the total value is Rs. 36-9-10. Incidence is very high, 48·56 per cent. Both crops were, however, very poor. Both would have been considerably better if the tank had acted as it was supposed to act as a *himáyat* or protection against scanty rainfall.

Experiment Nos. 108 and 109.—Rice, *Kada*, tested by Mr. D'Souza and *vál* by Mr. Mehta. The rice anna estimate is given as 20, which I fancy is too high; 16 is probably nearer the mark. The soil is *káli besar* and the cultivation is described as 'high.' The field (Pot number) measures 34 gunthas and is assessed at Re. 1-6 or Re. 1-9-10 per acre. The number is of course assessed as *Jiráyat*. It was converted into rice land about 10 years ago. Till lately it was leased out. The cultivators pay the Government assessment and half the produce to the Khátedár as rent, who therefore must have made rather a good thing out of it. The Khátedár now cultivates himself. He stated that the field never yielded more than 17 maunds till this year. This of course I do not for a moment believe, as it only comes to half a maund per guntha or Rs. 15 worth of produce per acre, while this year the outturn is worth well over Rs. 60. The seed-bed measured 8 gunthas. It was after ploughing manured with 8 baskets of fish manure at 4 annas a basket. After the seed was broadcasted the seed-bed was ploughed again so as to cover the seed and fish manure and prevent dogs from getting at the latter. The field itself was green manured, $1\frac{1}{2}$ maunds of *san* being sown and dug in when 2 feet high. It was also manured with 20 baskets of fish manure per acre. The seed rate was 185 lbs. per acre, which seems excessive, but I accept it as correct. The shortness of the rains did, it is said, less harm to this field than to others owing to the earliness with which the sowing and transplanting operations were carried out. The outturn was 2,984 lbs. per acre and 1,620 bundles straw. Why the number of bundles is so low I do not quite understand. The yield is valued at Rs. 60-11-2. The *vál* outturn, estimated by Mr. Mehta as an 8-anna crop, is decidedly poor, being only 388 lbs. per acre of pulse. The seed was drilled, 40 lbs. per acre. The value of the outturn is Rs. 9-4-11. Mr. Mehta has nowhere made any remarks for the individual experiments among the second crop tests he has taken. This is a pity, for it would be interesting to know why the outturn of the second crop was so poor. There can, however, be little doubt that it is owing to the soil not having retained sufficient moisture after the short rainfall. The total value of the two crops was Rs. 70-0-1 and the inci-

* Usually broadcasted in the north of the district.

† Calculated. For an actual acre probably so much would not be required. More seed is always sown proportionally for small areas.

dence 2·30 per cent. This of course is extremely low, but the land will now be re-classed as rice and assessed accordingly.

What that assessment will be it is impossible for me to say without knowing maximum rates and classification. It would not, however, be very high, because there is no tank and therefore water annas cannot exceed 8; and because at present for soil Párnera is in group V with a maximum soil rate of only Rs. 2-3.

Experiment No. 110.—The last experiment on rice was taken by Mr. D'Souza at Ronvel. The variety is *Vankvel*. The field measures 1 acre 33 gunthas and is assessed at Rs. 17-8, including Rs. 7-4-10 for tank *himáyat* or Rs. 9-9-5 per acre. The soil is *káli besar*. The field is said by Mr. D'Souza to grow rice and *vál* invariably. Mr. Mehta reports that there was no second crop this year "in or near the *kiári*." The seed-bed was partly rábed* and partly not rábed. Whether it is on the whole better to ráb or not in Balsár appears doubtful. If a seed-bed is rábed, it does not require weeding. To the *rohium* 4 loads of manure were applied; to the *ádhar* 6 loads; the manure on the latter was weighted down by 4 loads of *kodra* stalks. The *ádhar* measured 8 and the *rohium* 5 gunthas. These 13 gunthas were sown with 5 maunds of seed for 2 Bighas of land (52 gunthas). Seed rate therefore comes to $9\frac{3}{4}$ gunthas seed-bed and 145 lbs. seed per acre; "the traditional $2\frac{1}{2}$ maunds per Bigha: Mr. D'Souza says. The "traditional" quantity in Bárdoli was only half this or a little more.

For the rest of the field no manure was this year applied, but the field was said to have been manured at the rate of $46\frac{2}{3}$ loads per acre the year before. As the cultivator has only a few cattle he cannot manure the whole of his holding every year.

The outturn was estimated by Mr. D'Souza as an 18-anna crop. This may be too high, as the season is said to have been one of "scanty rainfall." The grain outturn was 2,728 lbs. and the straw 2,630 bundles per acre. Total value of the produce was Rs. 60-0-11 and incidence 15·96 per cent. It must be remembered that there is usually a second crop.

Mr. D'Souza remarks:—"This number like about 30 other surrounding numbers bears a fairly high tank *himáyat*, yet the tank is silted up and its waste weir tumbled down; it is now perfectly useless for purposes of irrigation."

There were two experiments on sugarcane taken in the táluka, one by Mr. D'Souza and one by Mr. Mehta, both on the Malbári variety. Mr. Mehta (Exp. No. 112) gives a good account of the cultivation of sugarcane of this variety of cane in Balsár and the southern tálukas of the district. There are here three common varieties: Malbári (white), Khajuria (red) and Bhuri† (grey). Khajuria is grown only in Jiráyat fields, as it cannot stand the excessive moisture of rice land in the monsoon. Malbári ripens in 10 or 11 months, but the other two require 12 months. If Malbári be left longer it flowers.

Experiment No. 111.—An experiment on Malbári cane by Mr. D'Souza at Abráma. Two survey numbers close together practically form one holding. They measure together 1 acre 8 gunthas and are assessed at Rs. 20-10 or Rs. 17-3 per acre. The land is Bágáyat. Mr. D'Souza says the *kasar* is not shown in the *Káiyam Kharda* (Village Form No. 1). Either the land is classed as Natural‡ Bágáyat or a little enquiry would have discovered a Bágáyat *Tukta* from which the amount of *kasar* could have been found.

The Khátedár before the rains of 1894 carted about 150 loads of fresh *gorádu* soil from his *vádi* (plantation of some sort, probably mangoes) into the field and applied 100 loads of manure. He grew a crop of *Kada* rice and then sublet the field for sugarcane cultivation for Rs. 5 per *vásu* or Rs. 150 per acre. This rent, which is very high, in consideration of the manure applied, includes the right to use the Khátedár's well. The Khátedár pays the assessment. The lessees began operations by several ploughings and levellings and clod crushings. The cane was planted by the plough. 1,860 *sántas* of cane were used per acre. A *sánta* is 6 *hátas* of cane and may include two or even three canes, and the seed cane costs

* Rábed beds are called *ádhar* and unrábed beds *rohium* or *taru*.

† *Káli*, *bhuri* or *rátí*—the variety tested in Bárdoli.

‡ Like the rice lands tested by me at Puni and Bárdoli.

Rs. 35 per 1,000 *santas*. Planting was immediately followed by a flooding. Twenty days after this, the field was weeded and hand-hoed by means of a *kudali* to loosen the soil as it dried and caked. The next watering was given early in February. In all there were 8 waterings till the rains, and the field is said to have been hand-hoed and weeded six times. Thirty maunds of castor cake was applied in September as a top dressing. A fence of four cart-loads of thorns was made before the rains and the crop was watered for Rs. 12 during five months.

The mill used was a three-roller iron mill. Mr. D'Souza says wooden mills have almost entirely gone out of use. The crop is estimated at 16 annas. The soil is *káli besar*. The outturn is 7,420 lbs. *gol*, 1,260 bundles dry leaves and 140 bundles green tops per acre. The weight of *gol* given is the net actual weight. It is usual, however, to weigh pots (*ghadas*) and *gol* together and make a deduction of $\frac{1}{4}$ th on account of the pots. The result is the market weight. The pots usually actually weigh far more than the $\frac{1}{4}$ th. The market weight of this produce is 8,086 lbs. Its value is put at Rs. 407-12-9 at 19 lbs. 33 *tolas* per rupee with the pots; add dry leaves at $3\frac{1}{2}$ cwt. per rupee, Rs. 19-4. Mr. D'Souza adds green tops at Rs. 2-3, but it is usual to ignore them because they are always eaten by the bullocks which work the roller. The total value comes to Rs. 427-0-9 and the incidence of assessment 4.02 per cent.

The particulars of outturn are given as follows:—

			Per 2 gunthas.	Per acre.
Number of canes	...	...	975	19,500
			Lbs.	Lbs.
Weight of stripped canes	...	...	3,188	63,760
Weight of juice	...	...	2,174	43,480
Weight of <i>Gol</i> and pots	...	...	404	8,080
Net weight of <i>Gol</i>	...	...	371	7,420
Weight of dry leaves (63 bundles)	...	...	424	8,480
Do. green tops (7 bundles)	...	...	123	2,460
Percentage of juice to cane	...	...	68.19	
Do. <i>Gol</i> to juice	...	...	17.06	
Do. <i>Gol</i> to cane	...	...	11.63	

Mr. D'Souza thinks that Abráma, Palsána, Pipalgabhán, Ohod and other villages famous for *gol* have been overdone to the great detriment of the soil; and that villages which have lately taken to sugarcane, such as Phadvel, Kachwad, Panchlai, show far better results.

Experiment No. 112.—An experiment on *Malbári* sugarcane at Kháparváda by Mr. Mehta. The field measures 11 gunthas and is assessed at Rs. 5-8, or Rs. 20 per acre. It is a Bágáyat rice number. It is partially alienated, the alienee paying only Rs. 4-13 instead of Rs. 5-8. It is leased from the owner by a Koli who "will pay," Mr. Mehta says, "according to the custom of the village Rs. 2 per *vása* equal to Rs. 60 per acre for the sugarcane crop." The soil is *gorádu*, superior* order soil. The seed rate was 1,800 *santas* (6 *hath* lengths) per acre. Twenty goats were folded for 2 months in the hot season of 1894 in the 11 gunthas, and 20 tons of farm-yard manure per acre was also put on. Then a rice crop was taken and then the cane was planted. The outturn was a 16-anna crop, 8,830 lbs. *gol* net valued, with dry leaves, at Rs. 493-1-10. Incidence comes to 4.05 per cent. The cane was watered from a well which is situated about 260 yards from the field. The particulars of the outturn are thus shown:—

			Per 2 gunthas.	Per acre.
Number of canes	...	...	1,245	24,900
			Lbs.	Lbs.
Weight of canes	...	...	3,735	74,700
Do. juice	...	...	2,576	51,520
Do. <i>Gol</i> and pots	...	...	502	10,040
Do. <i>Gol</i> net	...	...	441½	8,830
Do. dry leaves	...	...	1,120	22,400
Do. green tops	...	...	666	13,320

* Probably Mr. Mehta says it will fall under Natural Bágáyat at revision, but his will of course depend upon the depth and quality of the water obtainable.

	Rs.	a.	p.	Rs.	a.	p.
Value of Gol at 19½ lbs. per rupee or Re. 1-12						
per maund ...	22	13	5	456	13	1
Value of dried leaves at Re. 1-8 per hundred						
bundles ...	1	13	0	36	4	9
Total ...				493	1	10
Percentage of juice to cane ...						68.96
Do. Gol to juice ...						17.13
Do. Gol to cane ...						11.82

In estimating the total value of the yield I have again, and always shall, cut out the value of the green tops as they are consumed on the field by the oxen which work the mill.

Mr. Mehta has the following note on the cultivation of sugarcane in the talukas of Balsár and Chikhli:—

“In the case of *kíaris* a crop of rice is invariably taken before sugarcane is planted. If the rice crop is manured heavily in May, no more manure is given to sugarcane except a top dressing of castor cake in June just before the rains at the rate of about 25 maunds per acre. In the case of *tari* land, superior order or Uttam Bágáyat soil, *san* is ploughed in at the end of July, followed in many cases by a moderate dose of farm-yard manure, say 5 tons per acre, and a top dressing of castor cake in June by well-to-do cultivators.

“The land is ploughed 8 to 15 times in October and November after removing the rice crop. The heavy *champan* or old and rejected upper plate of the sugarcane mill is worked three or four times at intervals to break the clods. Canes are planted whole by means of a *nágar* (the big plough) drawn by 6 bullocks. They are planted 3 or 4 inches* deep. Planting of sets instead of whole canes is understood, but not practised. The cultivators say that though sets require a smaller number of canes to plant an acre than whole canes they still prefer their own method as it is the quicker of the two and does not necessitate the field being inundated at the time of planting. Those fields that are planted in November do not require watering till the middle of February. Late planted canes have to be watered to assist germination in January. It is the practice to grow tobacco, melons, &c., in sugarcane fields. Round about the town of Balsár this practice is not now followed to any extent. But in the northernmost villages of Balsár, in the rich Gáikvádi sugarcane growing villages between Amalsád and Bilimora and in the Chikhli taluka, tobacco and other crops are largely grown in sugarcane fields. The yield of tobacco from such fields is worth from Rs. 10 to Rs. 50 per acre. The row of sugarcane next to the tobacco is said to suffer proportionately.

“Sugarcane requires 9 waterings to grow it to perfection, but, as a rule, 6 waterings are given, and if the water-supply is not sufficient for the area planted by different occupants drawing water from the same well, 4 waterings are all that is given from February to May. If the harvesting of Malbári is delayed, it has to be watered once after the Diváli, especially if it has received a heavy top dressing of castor cake. The rows of tobacco are irrigated twice before the first watering is given to the sugarcane. Immediately after each watering the field is hand-hoed to prevent cracks and destroy weeds.

“1,800 canes, *sántas*, each 6 cubits or 9 feet long are required to plant an acre of Malbári and 2,000 of Khajuria canes. Although Khajuria has more nodes, and consequently more eyes, it requires a larger number of canes to plant an acre, because it is planted closer, as it does not tiller so well as the Malbári. Malbári seed canes cost Rs. 35 and Khajuria and Bhuri Rs. 25† per 1,000 canes, each 9 feet long. About 8 to 10 gunthas of seed cane are required to plant an acre. After planting, the field is ploughed lightly to level the surface soil.

“No expert is employed in *gol* making as in the Deccan. Sugarcane is so largely grown that everybody seems to understand the manufacture of *gol*. In

* Other experimenters say 8 inches, but 4 inches is probably correct.

† Mr. D'Souza says Rs. 30.

boiling juice, crushed canes and *tuver* and *juvár* stalks, if available, are used in addition to a small quantity of wood. It takes much more time to boil down the juice to the proper consistency if wood is not used.

“Ratoon crops are never met with. People say that the second year’s crop is so poor that it does not pay to keep it, and that in *kiáris* it suffers from the excess of moisture during the monsoon.”

Mr. Mehta gives the cost of cultivating an acre of Malbári cane as under :—

<i>Cost.</i>				Rs.	a.	p.
12 ploughings in October-November	...	...	...	10	8	0
Digging out and planting canes (1 plough, 6 bullocks, 1 cart and 2 bullocks, and 10 men)	...	...	...	2	8	0
15 tons (45 cart-loads) manure at 12 annas per cart	...	...	...	33	12	0
Watering 6 times—each time 4 bullocks and 3 men for 5 days.	...	...	...	30	0	0
Hand-hoeing 4 times, each time 10 men	...	...	...	5	0	0
Half value of Kos (bag) and ropes	...	...	...	4	0	0
Fencing	...	...	...	5	0	0
Castor-oil cake 25 maunds at 8 annas	...	...	...	12	8	0
Crushing cake and applying it—16 men	...	...	...	2	0	0
Cutting canes and making Gol, 12 men at 4 annas, 10 bullocks for 7 days	...	...	...	31	15	0
Wood for boiling juice	...	...	...	32	8	0
Hire of mill, &c., at Rs. 1½, for 7 days	...	...	...	10	8	0
Earthen pots at Rs. 4 per hundred, including cartage	...	...	...	9	0	0
1,800 seed canes (Sántas) at Rs. 35	...	...	...	63	0	0
Sundries	...	...	...	10	0	0
Land assessment, say	...	...	...	15	0	0
Total	...	...	...	277	3	0

<i>Produce.</i>				Rs.	a.	p.
10,000 lbs. Gol (market weight)	...	...	...	455	0	0
Radh (dry leaves) 2,500 bundles	...	...	...	37	8	0
Green tops	...	...	...	*10	0	0
Total	...	...	...	502	8	0

Mr. D’Souza gives here and there at odd places the number of men required to do the various operations and the cost of them. In most cases they differ from Mr. Mehta’s estimates, but are sometimes higher and sometimes lower. On the whole, there is not much difference. It must be remembered that sugarcane can be grown much more economically, with of course an inferior yield. Many of the Káliparaj people grow little bits of cane and rely upon its produce “to pay off the Bania.” With regard to the yield supposed by Mr. Mehta, 10,000 lbs. *gol*, it is clear that so large an amount is not usually got.

There were 13 old experiments in this *táluka*, many of them of great value. Mr. Syad Nuruddin Khán’s tests on sugarcane are fully dealt with in the printed report for 1890-91. That officer also took 3 tests on tank lands which grow grain and other rabi crops, after the water dries up, and which bear an assessment of about Rs. 2-14-0 per acre, besides giving an irrigation revenue. In one case the incidence was found to be very high, in 2 cases medium. There were three experiments on lands growing castor, and lightly assessed as Jiráyat. The incidence was light. There were three experiments on a first crop of rice by Mr. Doderet. All three fields yielded fairly. The incidence of assessment was very light on one, moderate on another, and high on the third. The assessment of the third field was, however, very high, Rs. 23-0-9 per-acre, which points to the fact that frequent crops of sugarcane are obtainable from it.

CHIKHLI TALUKA.

There were 17 experiments done in this *táluka*, 4 on *juvár* and *tuver* by Mr. Mehta, 6 on rice followed in 4 cases by a second crop by Messrs. D’Souza, Fforde, Mehta and Pránlál, and 3 on sugarcane by Mr. D’Souza. It is a pity there are no experiments on castor seed and *kodra* (*Paspalum scrobi-*

* Calculated in, because the bullocks have been charged for on the expenditure side.

eulatum), both of which are largely grown in Chikhli. *Ragi* (*Elusine coracana*) also might with advantage have been tested.

Experiment No. 113.—An experiment on *juvār* and *tuver* by Mr. Mehta. That officer explains that he undertook to do *juvār* experiments (because Mr. D'Souza went on leave) rather late in the season after the crops on the lighter soils which invariably ripen first had all been cut. Mr. Mehta says: "The soil on which these experiments were made is as good a Jirayat soil as is met with anywhere and is not the representative of the ordinary shallow soil full of stones or lime nodules which is the characteristic of the Jirayat soils of Chikhli." The village of this experiment, Degām, belongs to the second group with a dry soil maximum of Rs. 3-8. The field measures 6 acres 26 gunthas and is assessed at Rs. 14-8 or Rs. 2-2-10 per acre. The soil classification* annas in original survey are 11½ with no subsoil annas. But the field is large and varies in quality, and the classification annas of the piece experimented on were 13.

The crop is estimated as a 20-anna one. The season is said to have been most favourable owing to the short rainfall and a heavy shower at the Diváli. The cultivation is described by Mr. Mehta as "extra good, having been manured." Six loads of manure were put on in May. This does not seem a very large dressing. The seed rate given is 4 to 5 lbs. *juvār*, 1 to 3 lbs. *tuver*, and ¼ to 1 lb. *choli* and *mag*. These seed rates appear rather low. The yield of grain was 928 lbs. *juvār* and 66 lbs. *tuver* plus 285 bundles *kadbi* and 65 lbs. *tuver* leaves, &c., the whole valued by Mr. Mehta at Rs. 30-5-6. Mr. Mehta values *juvār* at 43½ lbs. per rupee, *tuver* the same, *kadbi* 100 bundles per Rs. 2-8, and *tuver* leaves 250 lbs. per rupee. The fodder is priced, in my opinion, far too high. Mr. Mehta says further on: "Grass is cheap in this taluka. Fairly good grass is sold for Rs. 4 per 1,000. *Kadbi* is not much thought of." How then he can value it higher than it is valued in the Surat Bazar I do not understand. On enquiry I find that about 8 annas per 100 bundles is a proper rate, and, substituting † this price for Mr. Mehta's, the total value comes to Rs. 24-10-5 and the incidence to 8.83 per cent. *Tuver gotar* or leaves and husk is also priced very high at 250 lbs. per rupee. The usual price is about 10 maunds the rupee, or between 350 to 400 lbs. However, the amount is trifling.

Experiment No. 114.—An experiment on the same two crops by the same experimenter at Bāmanvel. The field measures 8 acres 11 gunthas and is assessed at Rs. 12 or Re. 1-7-2 per acre. This field also varies a good deal in quality. As a whole, it is classed at 9 annas and the piece tested at 11.

The soil is the same as in the case of the last experiment, black soil more or less mixed with lime; the portions experimented on had no lime. The anna valuation is 20. The cultivation is described as "good, same as the ordinary Jirayat cultivation anywhere else." The seed rate is the same as in the last case. No manure was applied. Outturn comes to 603 lbs. *juvār* and 255 lbs. *tuver* with 245 bundles of *kadbi* and 170 lbs. *tuver* refuse, the whole valued at Rs. 21-11-9. Incidence works out to 6.66 per cent.

The first of these fields has grown *juvār* and *tuver* or *kodra* and *tuver* for many years. The second field was only broken up for cultivation in 1892-93 and since then has grown *juvār* and *tuver* or *kodra* and *tuver*.

Experiment No. 115.—A field at Edhal measuring 2 acres and assessed at Rs. 5 or Rs. 2-8 per acre, a field with a uniform surface, classified at 13 annas.

The field has grown cotton, but is usually under *juvār* and *tuver*, some of it sometimes lying fallow. The crop is estimated at 18 annas. The soil is the same as in the other fields. No manure was applied. The cultivation is ordinary. The outturn comes to 691 lbs. per acre *juvār* with 213 lbs. *tuver*, 190 bundles *kadbi* and 130 lbs. *tuver* refuse, valued at Rs. 22-6, the incidence coming to 11.17 per cent.

* The classification was re-done especially for this report and the old classification was found correct, except in the case of Edhal where the old number has been divided by a road, formed into two numbers now, and classed *de novo*.

† In each of Mr. Mehta's *juvār* experiments I have lowered his figures in this way.

Experiment No. 116.—A field at Minkachh. It measures 3 acres 17 gunthas and is assessed at Rs. 16-3 or Rs. 4-11-7 per acre. In the assessment is included Rs. 5-10 for well water, there being an old well. The old classification annas for this number are available. For neighbouring numbers the classification varies from 12 to 14 annas and this field is classed at 14 annas and its classification has been confirmed for the bulk of the field. The soil is assessed at Rs. 3-1-4 at present deducting the well *kasar*. Neither in this nor in any of the three other fields is there any subsoil classification at revision.

For the last few years the field has grown the *juvár* mixture with an occasional patch of *nágli* (*Elusine coracana*) or drilled rice. The anna estimate of this year's crop is 18; soil, cultivation and seed rate are the same as in the other fields. No manure was applied. The total outturn comes to 757 lbs. *juvár* and 525 lbs. *tuver* with 280 bundles *kadbi* and 382 lbs. *tuver* refuse valued in all at Rs. 32-8-11. Incidence works out to 14·50 per cent. If we deduct the well *kasar* the incidence would work out to 9·47 per cent.

I give a table showing these fields :—

Village.	Yield.	Crop of test.	Value of gross produce per acre.	Assessment per acre (original survey).	Percent-age incidence of assessment.	Bhág annas (revision survey).	Assessment per acre (revision survey).
			Rs. a. p.	Rs. a. p.			Rs. a. p.
Degám ...	Survey No. 912 (Exp. No. 113)	Juvar and Tuver.	24 10 5	2 2 10	8·83	Soil 11½	2 8 3
Bámanvel ...	Survey No. 113 (Exp. No. 114)	Do. ...	21 11 9	1 7 2	6·66	Soil 9	1 11 0
Edhal ...	Survey No. 335 (Exp. No. 115)	Do. ...	22 6 0	2 8 0	11·17	Soil 13	2 13 6
Minkachh ...	Survey No. 217 (Exp. No. 116)	Do. ...	32 8 11	4 11 7 * 3 1 4	14·50 * 9·47	Soil 14	3 1 0

* Without well rate.

The maximum rates taken are Rs. 3-8 for soil for Degám, Edhal and Minkachh and Rs. 3 for Bámanvel, the present rates, no proposals for revision rates being known. As usual, of course the application of the distance scale will slightly alter the revision survey rates from those now given. If the present maximum rates are retained, the assessment seems very light.

In giving the outturn results Mr. Mehta has added in the Edhal and Minkachh experiments 10 lbs. *juvár* grain per 8 gunthas for what is known as *Ponkh*, that is to say, the heads plucked when not quite ripe and eaten fresh roasted. No *Ponkh*, Mr. Mehta says, was eaten in the case of the other two fields.

Comparing these experiments with those recorded in the northern talukas, two points are very noteworthy. The highest maximum for 16 annas in the Chikhli taluka in the case of Jirayat soils is now Rs. 3-8. It is double that in Chorási. Mr. Mehta's remark about these particular soils being as good as any dry crop soils in the district can, I think, hardly be correct. Still at present the incidence of assessment is very much lighter here than in the north. The four experiments in Chikhli give an average outturn of Rs. 25-5-6 and an incidence of 10·66 per cent. Finding out what a proportionate 16-anna crop is in Chikhli, we have the crop worth Rs. 21-7-2 and an incidence of 12·58 per cent. The second point that is noteworthy is the excellence of the *tuver* compared with the miserable outturn of that pulse in other talukas.

The next experiments I take are those on rice and rice followed by a second crop.

Experiment No. 117.—The area of the Pot number tested is 16 gunthas assessed at Rs. 4-12, of which Rs. 1-9-7 are for tank assistance, or Rs. 11-14 per acre. The rice tested is *Kolamb* priced at 38½ lbs. per rupee or Re. 1 per maund which is the same price as that taken by me in Bárdoli. The cultivator is a Boráh and the cultivation described as good. Of the soil the experimenter, Mr. D'Souza, says: "The soil is a dark brown variety, like most of the rice soil in Chikhli taluka; it is mixed with a fair proportion of clay and is deep and re-

tentive of moisture. It contains, however, an admixture of nodules of limestone and is hence popularly known as *dádriváli*. The abundance of such limestone is alleged by the villagers as the reason why no second crop can be raised with success in this and many surrounding fields." As a matter of fact there appears to be a second crop sometimes. There was one this year, but it was found impossible to get to the field to test it. The seedlings were raised in a rábed bed $3\frac{3}{4}$ gunthas in area on which was sown about $1\frac{1}{4}$ maunds of seed. The acre average comes to 9.4 gunthas of seed-bed and 128 lbs. of seed, an area and amount which, as I have often observed, would not be necessary if so much as an acre were actually planted. The ráb materials were 4 loads of cattle manure with a layer of one load of *kodra* stalks. This was set fire to and on it $2\frac{1}{2}$ loads of pure dung were spread. The seed-bed was then ploughed and the seed broadcasted over it at the first rains. The seed was covered in with another plough and the whole levelled. It was not found necessary to weed* the seed-bed. The seed-bed appears to have been in another field.

The permanent bed of 16 gunthas was manured with 7 loads of farm-yard manure. A preliminary ploughing was given to it in June and it was puddled, before transplanting the seedlings into it, by two ploughings and two levellings. It had to be hand-weeded in September. The field was watered twice from the tank, at the beginning and at the end of September. The total outturn, estimated as an 18-anna crop, was 2,852 lbs. grain and 3,800 bundles straw per acre valued at Rs. 8.3-9-3. Incidence works out to 14.20 per cent, which is light.

Alipor is a village of group II at present with maximum rates for rice lands of soil Rs. 5 and water Rs. 8, a possible highest † of Rs. 13.

Experiment Nos. 118 and 119.—Experiments on *Kolamb* rice by Mr. D'Souza and *láng* by Mr. Mehta at Ránkuva, a village of present group IV. Maximum rates for rice Rs. 2-12 for soil and Rs. 7-8 for water.

The field measures 1 acre 2 gunthas and is assessed at Rs. 11, including Rs. 3-15 for tank water, or Rs. 10-7-7 per acre. The soil is black soil. On 39 gunthas of the field *Kolamb* rice was grown and on the remaining 3 *Sukhvel*. For the former $2\frac{1}{4}$ maunds of seeds were sown on a manured seed-bed of 10 gunthas, giving a seed rate of 89 lbs. sown on 10.25 gunthas of seed-bed per acre. The seed rate is rather low and the area of the seed-bed very large. This seed-bed was in part of the field and was afterwards planted with seedlings like the rest. It is said to have been manured with 8 loads of manure. It had to be weeded twice. The rest of the field, 29 gunthas, is said to have been manured with 22 loads of farm-yard manure mixed with sweepings and rubbish. It had to be weeded twice, once at the end of August and once in the middle of September. The season was one of scantier rainfall than usual, but Mr. D'Souza does not say to what extent, if any, the tank water was used. The outturn, a 14-anna crop, was 2,015 lbs. grain and 3,000 bundles straw per acre valued at Rs. 59-14-3.

Mr. Mehta tested the second crop *láng*. The field has had a second crop at any rate for the last 6 years and the second crop was *leng* on all but one occasion. The yield was this year poor. Mr. Mehta calls it only a 3-anna crop, although he states that the late rains about the Diváli were highly favourable. They were, I expect, hardly sufficient to counteract the bad effects of the very slight fall of August and September. Thirty pounds of seed per acre were put on, drilled. The yield comes to only 176 lbs. pulse per acre with 65 lbs. leaves and 155 lbs. stalks valued at Rs. 4-1-4. The value of the double yield comes to Rs. 63-15-7 and the incidence of assessment to 16.37 per cent.

Experiment Nos. 120 and 121.—Experiments on *Kolamb* rice by Mr. D'Souza and *vál* and *san* by Mr. Mehta at Surkhái, a village of the same class and with the same rates as Ránkuva. The field under test forms part of Survey No. 125, the whole field measuring 32 gunthas and assessed at

* It is not usually necessary to weed rábed seed-beds.

† Where I give a possible highest for rice land thus it is only in case there is perennial tank water which is very rare. With the ordinary Surat tank the highest possible assessment is found by adding up the soil and water maximum rates; thus for this field Rs. 13. This remark applies to all cases where I quote highest possible for rice lands.

Rs. 8, including Rs. 3 for tank water, or Rs. 10 per acre. The soil is black soil and the field has, six years out of ten, grown a second crop, usually of *vál*. The *kiári* tested measurss 16 gunthas. Seedlings for this piece were raised on a bed of 3 gunthas in a portion of another field. Thirty *sers* of seed were sown giving an acre average rate of 72 lbs. of seed sown on $7\frac{1}{2}$ gunthas of seed-bed. The seed-bed was manured with 4 loads of manure. It was not weeded; but was found very foul at the time of transplantation, and it was rather a troublesome job to free the seedlings from weeds and rubbish.

The permanent bed of 16 gunthas was manured in June with 8 loads of farm-yard manure. Mr. D'Souza continues:—"Immediately after transplanting, the cultivator sowed broadcast 2 maunds of *san* seed at 2 maunds the rupee, then filled the *kiári* with water so as to make the *san* seed rot and form manure at the roots of the seedlings; in 8 days all the seed was completely decomposed." The field was weeded three times. The field was once watered from the tank; it needed a second watering, but water failed in the tank. The outturn, a 16-anna crop, was 2,645 lbs. grain and 3,104 bundles of straw per acre valued at Rs. 76-8-4.

The rice crop was followed by a mixed crop of *vál* and *san*. The combined crop was estimated as a 10-anna one. Seed sown was 35 lbs. *vál* and 5 lbs. *san* per acre drilled. Outturn came to 92 lbs. *vál* and 455 lbs. *san*. Mr. Mehta gives the byproduct at 480 lbs. *vál* leaves, &c., and 240 lbs. stalks. This seems a very large amount of byproduct compared with the grain outturn, but there is no reason to doubt its correctness, for *vál* varies so greatly in the proportion of leaves and seed. The *san* is priced at 68 lbs. per rupee, which is rather higher than what Mr. D'Souza gave, 2 maunds or 77 lbs. per rupee. The whole of the second crop is valued at Rs. 11-13-9 and the total of the two crops comes to Rs. 88-6-1 and incidence of assessment to 11.31 per cent.

I may here note that while Mr. D'Souza calls this soil *káli* (black), Mr. Mehta says it is *besar* (middle colour). It is not likely that the soil is true black soil and Mr. D'Souza has himself said that most of the Chikhli rice soils are dark brown.

Experiment Nos. 122 and 123.—Both rice, *Kada*, and *vál* were tested by Mr. Pránlál Harkisandás. As in the other experiments taken by this officer he practically tells us nothing about them. The field measures 1 acre 3 gunthas and is assessed at Rs. 8-8 or Rs. 7-14-6 per acre. There is no tank. About 50 cart-loads of ordinary manure were applied, it is said, to the number, including the seed-bed which was in the field. This seems a considerable exaggeration, but Mr. Pránlál offers no comment. The soil is *káli máti*, black soil. The cultivation is said to be good, and 130 lbs. seed per acre were used. Whether the seed-bed was rábed or not is not stated. The yield, a 14-anna crop according to the experimenter, was 2,290 lbs. grain and 4,640 lbs. straw.

The seed rate of the *vál* crop is not given. It was an excellent crop. No separate anna estimate has been given unless Mr. Pránlál means that 14 annas represents the double crop. The *vál* outturn came to 1,157 lbs. pulse and 555 lbs. *gotar* or leaves and husks per acre.

Mr. Pránlál values *Kada* rice and *vál* both at $45\frac{1}{2}$ lbs. per rupee and *vál* fodder at 150 lbs. The valuation calculated thus comes to Rs. 86-1-2 per acre. The price of the fodder may stand, but I cannot accept the price of the grain as correct. I shall take $51\frac{1}{2}$ lbs. for *Kada* rice and $57\frac{1}{2}$ lbs. for *vál**, which are, I am sure, the correct rates, at any rate very approximately. Mr. D'Souza gives 54 lbs. per rupee for *Kada* in Párdi and $50\frac{1}{2}$ lbs. in Balsár, and my rate at Bárdoli and Jalálpor was 12 annas the maund or $51\frac{1}{4}$ lbs. per rupee.

At the rates I take the *vál* crop was worth Rs. 23-13-1 and the rice crop Rs. 51-1-5 or together Rs. 74-14-6. The incidence of assessment comes to 10.55 per cent. which is low.

Thála is a village of group II and its present maximum rates for rice lands are for soil Rs. 5 and for water Rs. 8.

* Mr. Pránlál himself takes $57\frac{1}{2}$ lbs. in his other *vál* tests, and I cannot help supposing this $54\frac{1}{2}$ lbs. must be a pure slip.

Experiment Nos. 124 and 125.—An experiment by Mr. Fforde, Gujarát Survey, on *Sukhvel* rice followed by *vál* which was tested by Mr. Mehta. The area of the field is 1 acre 8 gunthas and its assessment Rs. 12, of which Rs. 4-8 is for tank water, or Rs. 10 per acre. Mr. Fforde says the field is sublet by a Chikhli Pársi for Rs. 17, the Pársi of course paying all Government dues. The field used to be sublet for Rs. 25, but the rent is now reduced, the people say owing to the fall in the price of rice. The soil is said to be “*besar*” with a little lime and salt, not so retentive of moisture as in the next experiment. The cultivation is said to be ‘indifferent sparse crop.’ Perhaps it is hardly fair to call the cultivation indifferent merely because the crop was not very good, for the season is characterised as one of ‘short rainfall.’ And of the manure Mr. Fforde says: “30 cart-loads per acre, of which 15 to 20 of pure farm-yard manure are mixed with 3 to 4 gunthas for seed-bed. The rest is mixed manure and is spread over the whole field.” This is surely liberal enough treatment. But the rate for the seed-bed is, as in the next test, most excessive.

The seed rate is not given, but seed is said to cost Rs. 3-8-8 per acre which makes the seed-rate rather more than in the next experiment, say 127 lbs. per acre applied to 3 gunthas of seed-bed.

The field of this experiment lay higher than that of the next and had less natural drainage into it. To this field the tank assistance which it gets is much more valuable than to the other. It was, however, flooded once about 19th October. The crop is called an 8-anna one. The grain outturn was 1,238 lbs. per acre and the straw 6,880 lbs. valued together at Rs. 41-3-10. The rice, *Sukhvel*, is valued the same as *Kolamb*; both are a little high. The straw is valued here at $13\frac{3}{7}$ cwts. per rupee, about one-third as much again as *Kolamb* straw is to be had for a rupee; I do not quite know why, nor does Mr. Fforde explain. Mr. Fforde gives the cost of cultivation here as Rs. 15-10-8 per acre.

The second crop, one appears to be always taken, was *vál*. Sixty pounds of seed per acre were sown broadcast. The outturn is estimated by Mr. Mehta at 6 annas. It comes to 347 lbs. pulse per acre with 270 lbs. leaves, &c., and 150 lbs. stalks, the whole valued at Rs. 8-1. The total value of the double crop comes to Rs. 49-4-10 and the incidence 20·28 per cent.

The village of experiment, Harangám, belongs to the present group IV and its maximum rice rates are Rs. 2-8 for soil and Rs. 7-8 for water.

Experiment No. 126.—This is an experiment on *Kolamb* rice by Mr. Fforde. The whole field measures 1 acre 8 gunthas and is assessed at Rs. 10, including Rs. 2-5-6 for tank water, or Rs. 8-5-4 per acre. Of the whole field 34 gunthas are sown with *Kolamb* and the rest with *Sukhvel* rice. Mr. Fforde does not give the amount of seed, but says it cost Rs. 3-3 per acre which appears to be the price of 3 maunds or $114\frac{1}{2}$ lbs. With regard to manure Mr. Fforde says: “33 cart-loads per acre—15 to 20 carts of farm-yard manure only in seed-bed of 3 to 4 gunthas. The rest of the manure is mixed with straw and ashes, &c., and is inferior. This inferior manure to the extent of 13 to 18 cart-loads is spread over the remaining area. The manure is applied in May, before sowing before rain falls. Only that portion which is applied to the seed-bed is ploughed in. The rest is top dressing.” Elsewhere Mr. Fforde gives the price of manure as Rs. 12-6 per acre. There is of course some mistake about the amount of manure applied to the seed-bed, as it is about five times as much as usual.

The field lies very low and catches a great deal of rain water, but the soil has lime in excess and the people say this damages the second crop of *láng* or *vál*, and castor is never sown. Tank water is said to have been taken only once about 10 days before reaping, and Mr. Fforde says the tank assistance would probably not have been required at all had rain not held off.

This field and another, measuring together 2 acres 2 gunthas and assessed together at Rs. 19-4, are said to be let out by the owner, a Boráh, for Rs. 34, the Boráh paying all assessment and Local Fund. He thus gets only Rs. 3-9 profit or Rs. 1-12 about per acre. The outturn is called a 12-anna crop. It is 1,813 lbs. grain and 6,830 lbs. straw per acre and is valued at Rs. 59-12. Mr. Fforde explains that both grain and straw were dried for 15 days. *Kolamb* rice is

valued at Re. 1-1 per maund or $33\frac{3}{4}$ lbs. per rupee which is a little high perhaps. I think one anna per maund too high. Incidence of assessment on the rice comes to 13·94 per cent. Mr. Fforde says his *ser* is 35 *tolas*. The common Surat *ser* is $37\frac{1}{2}$ *tolas*. Mr. Fforde replies in answer to a reference that he used a *measure ser* of 35 *tolas* and that the grain is bought and sold by this measure. This is certainly not the case in the vast majority of Surat villages. It does not much matter, as it does not affect the result in pounds.

The experimenter says the people gave the following estimate of expenses for the field :—

					Per acre.		
					Rs.	a.	p.
Manure	...	...	...	...	12	6	0
Seed	...	...	...	...	3	3	0
Ploughing and transplanting	...	...	...	...	3	2	0
Sowing	...	...	...	...	1	8	0
					20	3	0

add to this assessment at Rs. 8-5-4 and total expenses come to Rs. 28-8-4, leaving a profit of Rs. 31-3-8 per acre, which is probably far more than is actually obtained, I expect. These vague estimates are, however, rarely of any use. There appears to be a second crop most years in this field. This year there was not. Nevertheless the incidence of assessment is very light. In all probability the second crop is not very valuable.

Bámanvel belongs at present to group III and its rates for rice land are Rs. 3-12 for soil and Rs. 7 for water.

Experiment No. 127.—An experiment on Malbári sugarcane by Mr. D'Souza at Phadvel. The field measures 2 acres 6 gunthas and is assessed at Rs. 22-8 or Rs. 10-7-5 per acre. There is no special water rate, as the number was classed as Bháta Bágáyat or Natural Bágáyat. The land is black soil and is really rice land growing sugarcane about every two or three years in part of the field. The maximum rate for Natural Bágáyat in this village is Rs. 8-12 for 16 annas.

Mr. D'Souza thus describes the cultivation, &c. :—

“This number belongs to one Daya Ranchhod who has holdings in the village assessed at about Rs. 400 per annum. He cultivates all his land by means of *hális*.* An average acre of sugarcane growing *kiári* can be sublet for Rs. 40† in this village, the Khátedár paying the assessment.

“In the month of Chaitra-Vaishákh (April-May) 20 cart-loads of pure cattle dung were applied to the field. Two ploughings and one levelling were given to it at the first rains, and rice known as *Kovchi* was sown broadcast. It was harvested in Ashvin (October). It fetches about Re. 1-8 less than *Kada* per *gáli* of $31\frac{1}{2}$ maunds.

“After the rice was harvested, 5 ploughings and cross-ploughings with two applications of the *champan* or log harrow were given to the field during October. Cane was then planted by *nágar* (large plough) at the rate of 1,250 ‡*sántas* per Bigha at Rs. 30 per thousand *sántas*. Immediately after planting it was watered by *kos*§; only one *kos* of the Rámio kind was employed. Six days after this it was hand-hoed by the *kudali* and weeded. The next watering was given in Fágan (February). In all six waterings and two more hand-hoeings and weedings were given till the rains. In Bhádarva (September) last two *khandis* of castor cake were applied as a top dressing at Rs. 8 per *khandi*. A fence was made with 5 cart-loads of thorns and it was watched for 4 months from Akhád to Ashwin (July to October) at Rs. 3 per month; crushing was done in the usual way by a three-roller iron mill.”

* Private servants or serfs.

† Mr. D'Souza does not say but it appears that this is only for the one year's cane, not so much would be obtained for a continuous lease.

‡ 1,875 units of 6 *haths* of cane each per acre.

§ Leather bag used to take the water out of the well.

The outturn figures are thus given :—

		Per 2 gunthas.	Per acre.
Number of canes	...	1,140	22,800
		Lbs.	Lbs.
Weight of stripped canes	...	3,933	78,660
Weight of juice	...	3,007	60,140
Weight of Gol and pots (market weight)	...	527	10,540
Net weight of Gol	...	475	9,500
Weight of dry leaves	...	589	11,780
Weight of green tops	...	346	6,920
		Rs. a. p.	Rs. a. p.
Price of Gol at Rs. 1-10 per maund	...	22 4 2	445 4 0
Price of dry leaves at Rs. 1-8 per 100 bundles	...	1 0 4	20 6 5
Total price	...	23 4 6	465 10 5
Incidence of assessment	...	...	2·25 per cent.
Percentage juice to cane	...	...	76·45
„ Gol to juice	...	...	15·79
„ Gol to cane	...	...	12·07

The percentage of *gol* obtained was very favourable. The crop is estimated at 18 annas.

Experiment No. 128.—Another test by the same officer on the same variety of cane, this time at the village of Pipalgabhán. The field measures 3 acres 36 gunthas and is assessed at Rs. 41 or Rs. 10-8-2 per acre. It is classed as Natural Bágáyat. The Khátedár cultivates himself. He has land paying a land assessment of about Rs. 600 and about 50 head of cattle. Mr. D'Souza says that most Khátedárs cultivate their own holdings themselves, and subletting for cane cultivation is the exception. When done, a rent of Rs. 45 per acre for the year is taken, the Khátedár paying the assessment.

About 40 loads of manure per acre were applied in the hot weather, and *san* seed was broadcasted at the rate of 2½ maunds per acre. The *san* was ploughed in as green manure. Fifteen ploughings and cross ploughings with 5 levellings are said to have followed. Cane was planted by the plough in the month of December at the rate of 1,875 *santas* per acre at Rs. 30 per thousand. The field was not watered till February; after that about once a fortnight. In all 10 waterings and 5 hand-hoeings were given till the rains, which is liberal. No top dressing of castor-oil cake was given. A fence of 16 cart-loads of thorns was made and the crop was watched by two men for 5 months. Crushing was done in the usual way with a three-roller iron mill.

The following are the outturn figures :—

		Per 2 gunthas.	Per acre.
Number of canes	...	900	18,000
		Lbs.	Lbs.
Weight of stripped cane	...	3,978	79,560
Weight of juice	...	2,853	57,060
Market weight of Gol	...	466	9,320
Net weight of Gol	...	408	8,160
Weight of dry leaves	...	451	9,020
Weight of green tops	...	346	6,920
		Rs. a. p.	Rs. a. p.
Price of Gol at Rs. 1-10 per maund	...	19 11 3	394 1 0
Price of dry leaves at Rs. 1-8 per 100 bundles	...	0 15 4	19 2 2
Total value of produce	...	20 10 7	413 3 2

Incidence of assessment (two years' assessment taken) 5·08 per cent. or for one year 2·54 per cent. Mr. D'Souza took two years' assessment on the ground that the sugarcane crop lasted practically two years. Such land, however, generally bears a crop of rice as well as one of sugarcane in the two years.

Percentage of juice to cane	...	...	71·71
„ of Gol to juice	...	...	14·30
„ of Gol to cane	...	...	10·25

The percentage results are very fair. The crop is estimated at 16 annas.

With regard to the field itself Mr. D'Souza says:—The soil is a rich loamy mould, deep chocolate in colour. The field was watered from a *pakka* well, although a good deal of sugarcane is also irrigated in the village from the adjoining *khádi* by *dhekudí*. The rotation of crops is shown by the following extract from Village Form No. III, part I:—

1. Sugarcane (*ummed*, i.e., just planted).
2. Sugarcane (*rasida*, i.e., full grown).
3. Rice and *vál*, 1 acre 20 gunthas, *guvár* 32 gunthas, *tuver* 32 gunthas, *vál* 32 gunthas.
4. *Kodra* 1 acre 38 gunthas, *tuver* 1 acre 20 gunthas, *guvár* 18 gunthas.
5. Sugarcane (*ummed*) 3 acres 21 gunthas, tobacco 15 gunthas.
6. Sugarcane (*rasida*).
7. Rice 2 acres, *tuver* 36 gunthas, *guvár* 1 acre.
8. Rice and *vál* 36 gunthas, ginger 2 acres 20 gunthas, onions 10 gunthas, castor 10 gunthas.
9. Sugarcane (*ummed*).
10. Sugarcane (*rasida*).

The question is whether land such as this should be classed now as Natural *Bágáyat* without caring whether its water comes from a well or from a *dhekudi*. Why not?

Experiment No. 129.—An experiment similar in every way at Ohod. The field measures 1 acre 22 gunthas and is assessed at Rs. 25-8 or Rs. 16-7-2 per acre. It is classed as *Bháta* or Natural *Bágáyat* and is really rice land growing sugarcane once in 5 or 6 years. The soil is said to be black soil. The *Khátédár* is the Patel of Degám and he has sublet the field to a Koli, the terms being that the Koli should pay Rs. 22 for taking a crop of rice from the whole number, and Rs. 22 per Bigha, Rs. 33 per acre, for the crop of sugarcane. The *Khátédár* thus receives Rs. 74 from the Koli and has to pay Rs. 54-3 assessment and Local Fund for the two years.

In the hot weather of 1894, 40 loads of manure per acre were put on the field and a crop of inferior rice called *Kamdi* was harvested. Then the field was prepared for cane by 8 ploughings and 4 levellings. Cane was planted in November at the usual seed rate, 1,875 *santas* per acre, costing Rs. 35 per thousand *santas*. Planting was immediately followed by watering and about 15 days after by hand-hoeing and weeding. The next watering was given in February and after that 8 waterings till the rains, and 4 hand-hoeings and weedings. Two *khandis* of castor cake were applied as a top dressing in September over half the number; but none is said to have been applied to the portion under experiment, because it had been well manured as a seed-bed for the rice seedlings. A fence of 10 cart-loads of thorns was made in June and the crop was watched by one man for 4 months for Rs. 5. Crushing was done in the usual way; but the mill was a wooden one and there are hardly any iron mills in the village. The crop is estimated as an 18-anna crop. The village belongs to the second class, and *Bháta* or Natural *Bágáyat* maximum rate is Rs. 11-8.

The outturn figures are:—

		Per 2 gunthas.	Per acre.
Number of canes	...	1,200	24,000
		Lbs.	Lbs.
Weight of stripped canes	...	4,044	80,880
Weight of juice	...	2,764	55,280
Market weight of Gol	...	544	10,880
Net weight of Gol	...	463	9,260
Weight of dry leaves	...	397	7,940
Weight of green tops	...	346	6,920
		Rs. a. p.	Rs. a. p.
Price of Gol at Rs. 1-10 per maund	...	22 15 7	459 7 6
Price of dry leaves at Rs. 1-8 per 100 bundles	...	0 14 10	18 9 7
Total value of produce	...	23 14 5	478 1 1

Incidence of assessment ...	...	...	Per cent.
Percentage of juice to cane	...	...	3.44
Do. Gol to juice...	...	...	68.34
Do. Gol to cane ...	...	...	16.75
			11.44

I add averages for the three experiments on Malbári sugarcane in Chikhli :—

			Per acre.
			Lbs.
Net weight of Gol	...	...	8,973
Value of crop...	...	...	Rs. 452 5 3
Assessment ...	...	...	12 7 7
Percentage juice to cane	...	...	73.40
Do. Gol to juice	...	...	15.61
Do. Gol to cane	...	...	11.26
Incidence of assessment on value of crop of	...	...	2.76

PA'RDÍ TA'LUKA.

There were six experiments on rice followed in each case by *vál*. Mr. Mehta took all the second tests, and except one done by Mr. Pránlál Harkisandás, Mr. D'Souza did all the first. There were 3 experiments on *naqli* by Mr. D'Souza and one on castor by Mr. Mehta and there were 4 experiments on sugarcane by Mr. D'Souza. The táluka has not been re-classed.

I first take the experiments on rice and *vál*. With one exception the rice was always *Kada* rice. Mr. Mehta selected the fields for Mr. D'Souza's experiments.

Mr. D'Souza says : " Mr. Mehta appears to have been handicapped in his choice by the fact that a good deal of rice had been cut before he commenced his tour. The fields he has selected, however, I have invariably found fairly representative of the area remaining uncut, but it is doubtful whether they may be taken as fair samples of the whole crops of their respective villages."

Experiment Nos. 130 and 131.—Rice followed by *vál*. The field measures 1 acre 4 gunthas and is assessed at Rs. 7 or Rs. 6-5-9 per acre. The soil is black soil and there is no irrigational facility. The rainfall was rather scanty, but a second crop was grown and appears to be grown every year. The cultivation is described as good. Three and a half maunds of seed are said to have been sown on a seed-bed measuring $9\frac{13}{21}$ gunthas giving an average seed rate of 127 lbs. on about 9 gunthas of seed-bed per acre ; of the seed-bed $3\frac{7}{8}$ gunthas was *rohium*, or unrábed and the rest *adhar* or rábed. The rábed bed is generally preferred in Párdi, because the process of burning kills all the weeds. The Párdi táluka, it must be remembered, is geographically a part rather of the Konkan than of Gujarát. Six cart-loads of manure are said to have been applied to the *rohium* portion of the seed-bed and 20 loads to the rest of the field. The outturn was 2,132 lbs. grain and 3,200 bundles of straw per acre worth Rs. 43-7-6. I have calculated the rice straw at the rate, as ascertained from the táluka, of Re. 1-4 per thousand bundles. The grain is valued by Mr. D'Souza at 54 lbs. per rupee.

The second crop of *vál* was tested by Mr. Mehta. It was broadcasted at the rate of 60 lbs. per acre. The outturn is said to be a 16-anna crop by that officer. It amounted to 809 lbs. pulse and 573 lbs. of *gotar*, leaves and husk, with 339 lbs. stalks valued at Rs. 18-0-5. Here again I may note that Mr. Mehta calls the soil *besar* and Mr. D'Souza black (*káli*). The total value of the double crop is Rs. 61-7-11 and the incidence of assessment is 10.34 per cent.

Maximum rice rates for Umarsádi (group II) are for soil Rs. 3 and for water Rs. 9.

Experiment Nos. 132 and 133.—Similar experiments at Bálda. The whole number measures 2 acres 15 gunthas and is assessed at Rs. 14-8 or Rs. 6-1-8 per acre. There is no tank. The field is divided into Pot numbers and the rice was tested in one and the *vál* in another. The average rate of assessment has therefore been calculated on the whole number and not on the Pót number.

The seed-bed was rábed. The Pot number into which the rice seedlings were transplanted was 25 gunthas and it received 15 loads of manure, 24 per acre. The seed rate comes to 74 lbs. per acre. The soil is said to be black by Mr. D'Souza and *besar* by Mr. Mehta. The crop is estimated at 14 annas and the butturn was 1,837 lbs. grain and 3,300 bundles straw per acre valued at Rs. 38-2-5.

Sixty pounds per acre of *vál* seed were broadcasted and produced a 12-anna crop, 615 lbs. pulse and 520 lbs. *gotar* with 330 lbs. stalks worth in all Rs. 14-10-10. The value of the double crop comes to Rs. 52-13-3, and the incidence of assessment to 11·55 per cent.

Maximum rates are the same as those for Umarsádi.

Experiment Nos. 134 and 135.—Another experiment of the same sort at Sodhalváda. The field measures 3 acres 30 gunthas and is assessed at Rs. 17 or Rs. 4-8-6 per acre. A second crop, generally *vál*, is grown every year. There is no tank. The cultivation is described as indifferent. Seedlings were raised on a rábed bed, 12 gunthas in size, and the seedlings from this were transplanted into 2 acres 14 gunthas. Five maunds of seed were sown and this gives a seed rate of 81 lbs. of seed on a seed-bed of 5 gunthas per acre of transplantation. The seed-bed was manured with six loads of cattle dung supplied by the cultivator's own cattle, about 8 in number. The main rice field was unmanured for fear lest the mortgagee of the number, a Sávkar, should demand higher rent, or oust him from his field if he improved it by manuring. The field was not weeded. The outturn of grain, a 12-anna crop, was 1,656 lbs. and of straw 3,600 bundles per acre worth together Rs. 35-2-8.

The *vál* was estimated only at 5 annas by Mr. Mehta. The seed was broadcasted, 60 lbs. per acre. The outturn was 244 lbs. pulse, 210 lbs. *gotar* and 126 lbs. stalks per acre worth Rs. 6-0-7. The value of the double crop was Rs. 41-3-3 and the incidence 10·99 per cent. The field is cultivated on a yearly lease. The cultivator pays the Sávkar Rs. 25 and the Sávkar pays the assessment Rs. 17 and presumably also the Local Fund charge. Mr. D'Souza makes the following remarks on the subject of Sávkar's and mortgages:—"In the course of *rújuvát* in this taluka I have ascertained that an immense amount of land, chiefly owned by Doria Khátedárs—perhaps even more than in other talukas—is in the hands of the Sávkar. The terms on which a Sávkar usually holds it is a mortgage, either with possession, *kabja giro*, or without possession, *san giro*. In not a few cases Sávkar's, especially Márwádi Vánias, have commenced to buy the land outright by *mobadlas** or to appropriate it by foreclosing the mortgages, and then cultivate it themselves or by their agents. These facts are interesting in a crop experiment report in so far as they throw light on the terms on which land can be sublet in the taluka. In cases in which land has come to be registered in the name of a Sávkar who is unwilling to cultivate it himself, he either sublets it on a yearly lease for rent varying from half as much again, as in the present experiment, to double the Government assessment; or he has it cultivated by a resident of the village who bears all the expenses of cultivation including seed, manure, &c., and in return goes halves with the Sávkar with regard to the produce, the Sávkar paying the whole of the assessment. In cases where the Sávkar is only a mortgagee, not Khátedár, the practice is different. In cases of *kabja giro* or mortgage with possession yearly rent-notes or deeds of lease are passed between Khátedár and Sávkar, and it is rarely that the Khátedár's possession is disturbed. The Sávkar knows that evicting him would be killing the goose that lays the golden egg. For both in *kabja giros* as in *san giros*, especially in long standing debts, the Sávkar, as a rule, insists that his debtor should, either for an indefinite period or during a number of instalments which he fixes at his discretion, yield to him the whole produce, he (the Sávkar) paying the assessment. The debtor meanwhile has to maintain himself and family on grain (*kháoti*) borrowed† from the same Sávkar on condition of returning half as much again next year."

It is not, as Mr. D'Souza observes, from such transactions between Sávkar and debtor that the difference between the economic rent and the Government assessment can be ascertained.

*Getting the *khátú* or registered occupancy entered in their name.

†In other words, this is the ordinary type of rack-renting

Maximum rice rates for Sodhalváda, group III, are for soil Rs. 2-12 and for water Rs. 7.

Experiment Nos. 136 and 137.—The same crops at Palsána. The field measures 1 acre 10 gunthas and is assessed at Rs. 12-8, including Rs. 3-2 for tank water, or Rs. 10 per acre. The number appears to always grow a second crop of *vál*. Thirty-two gunthas of the field are separate and the test was taken in that portion. Seedlings were reared in a corner of this field. Seed-bed 5 gunthas or $6\frac{1}{4}$ gunthas per acre; seed rate 192 lbs. per acre which is very high. The seed-bed was manured with 12 loads of manure; on the 27 gunthas of field remaining 15 maunds castor cake were spread. The cake was crushed and applied by hand to the roots of the seedlings about 10 days after transplanting. The Khátedár has about 4 acres of rice land and cannot manure every year. Mr. D'Souza remarks that this is generally the case in Párdi where rice is the only staple. The crop was once flooded from the tank at the beginning of October. Mr. D'Souza calls the cultivation indifferent, but the word is hardly a fair one. The crop is said to be a 12-anna one. The acre outturn was 1,697 lbs. grain and 2,780 bundles straw worth Rs. 34-14-1.

The *vál* crop is estimated by Mr. Mehta at 9 annas. Sixty pounds seed were broadcasted. The outturn was 555 lbs. pulse, 415 lbs. *gotar* and 240 lbs. stalks per acre worth in all Rs. 12-12-7. The value of the double outturn is Rs. 47-10-8 and the incidence of assessment 20·97 per cent. Here as elsewhere Messrs. D'Souza and Mehta differ as to the description of soil, the former calling it black and the latter *besar*.

Maximum rates for Palsána for rice land are for soil Rs. 3 and for water Rs. 10.

Experiment Nos. 138 and 139.—The same at Párdi Kasba itself except that the variety of rice is different. *Dángi* is rather superior to *Kada*, selling at the rate of $47\frac{1}{2}$ lbs. per rupee. It is only grown in fields where there are exceptional facilities for irrigation and on soils which are retentive of moisture. The field of experiment measures 9 gunthas and is assessed at Rs. 2, including Re. 0-4-6 for tank water, or Rs. 8-14-2 per acre. The field usually has a second crop. The assessment for tank water is low and Mr. D'Souza explains that the tank is not used for irrigation at all, but the rate he conjectures must have been imposed for soakage water. Only seven of the numerous rice fields surrounding the tank are assessed for tank water. The holding measures 39 gunthas and for this area 96 lbs. seed were sown on a seed-bed of 16 gunthas—average per acre about $96\frac{1}{2}$ lbs. on $16\frac{1}{2}$ gunthas of seed-bed. There appears to be two seed-beds which are used alternately year and year about. Twelve loads of cattle dung were applied to the bed this year and it was raked. Owing to the break in the rains the seedlings were not transplanted till August. Seven loads of ordinary manure are said to have been applied to the 9 gunthas of permanent bed, $31\frac{1}{2}$ loads per acre. It was not weeded, nor was the seed-bed. The outturn of grain, a 16-anna crop, was 2,309 lbs. per acre with 4,200 bundles of straw worth together Rs. 53-13-11.

The *vál* crop is estimated by Mr. Mehta as an 8-anna one. Sixty pounds seed were broadcasted and the outturn was 427 lbs. per acre of pulse with 427 lbs. *gotar* and 169 lbs. stalks valued at Rs. 10-8-6. The soil is the same as in previous experiments—*besar*, or according to Mr. D'Souza black. The total value of the double crop was Rs. 64-6-5, and the incidence of assessment 13·79 per cent.

Maximum rates for Párdi are Rs. 3 and Rs. 10 respectively for soil and water.

Experiments Nos. 140 and 141.—Experiment at Umarsádi, on *Kada* rice by Mr. Pránlál Harkisandás and *vál* by Mr. Mehta. The soil is *besar*. The number measures 1 acre 17 gunthas and is assessed at Rs. 13-8 including Rs. 4 for tank water, or Rs. 9-7-7 per acre. Mr. Pránlál says the season was "favourable on account of the surface water from the surrounding Jiráyat high lands having found its way into this *kiávi*." This of course as a matter of fact has nothing whatever to do with the season, but must happen every year, and is due to the position of the field. The crop is estimated at 18 annas. The cultiva-

tion is said to be "very good indeed," but Mr. Pránál gives us no description or reason for the praise except the vague statement that the owner, a porter, seems to have properly looked after the field. Eighty* carts of ordinary manure are said to have been applied to the whole area, 1 acre 17 gunthas, including the seed-bed which was in the number. From this I suppose the seed-bed was not rābed, but Mr. Pránál does not say. The seed rate is given as 130 lbs. per acre and the area of seed-bed between 3 and 4 gunthas for the whole field, which is low—too low probably to be believed. Mr. Pránál makes no remarks at all about the field or crop. The total outturn per acre is 3,346 lbs. grain and 2,784 lbs. straw. The experimenter again values the *Kada* rice at 45½ lbs. and fodder at 700 lbs. per rupee. For reasons given elsewhere I cannot accept this valuation and take it at 51½ lbs. At this rate the value of the whole comes to Rs. 68-15-2.

Mr. Mehta tested the second crop, *vál*. *Vál* appears to be always grown as a second crop on this field. No separate anna valuation is given. Seed rate was 60 lbs. broadcasted and outturn was 783 lbs. pulse plus 1,440 lbs. *gotar* and stalks, the whole valued at Rs. 19-3-0; pulse valued at 57½ lbs. per rupee. The 1,440 lbs. of byproduct are valued at Rs. 6-9 but the separate figures for *gotar* and stalks are not given. Supposing there were 900 lbs. *gotar*, this, valued at 150 lbs. per rupee, comes to Rs. 6, and, I think, we may fairly allow the stalks to be worth about 9 annas, so that the valuation for byproducts may stand.

The total value of the two crops comes Rs. 88-2-2 and the incidence to 10·75 per cent. which is very light.

Experiment No. 142.—I now take the one experiment by Mr. Mehta on castor. Of the total cultivated area of the *táluka* 13·2 per cent. is said to be under this crop. Mr. Mehta gives very meagre details and in fact makes no use of the remark column. The field measures 2 acres 36 gunthas and is assessed at Rs. 3-4 or Re. 1-1-11 per acre. The soil is said to be "poor and uneven and containing lots of lime." The crop is said to be a 12-anna one and the late rains about the *Diváli* were very favourable. No manure was applied. The field was cultivated from 1880-1885 and used for grazing after that. This year it was again broken up for cultivation. Forty pounds seed are said to have been drilled per acre. The outturn was 198 lbs. oil-seed per acre and the seed is priced at 24 lbs. per rupee. In my experiments in *Bárdoli* and *Jalálpor* I took about 21 lbs. per rupee. The total value comes to Rs. 8-4 per acre and the incidence of assessment to 13·57 per cent.

Umarsádi (group II) has a dry-crop maximum rate of Rs. 1-12.

The next three experiments are on *nágli* (*rági*, *náchni* or *bávto*, *Elusine coracana*) by Mr. D'Souza. A fair area is under this crop, 7·8 per cent. of the total cultivated area in the *táluka*. Mr. D'Souza makes the following general remarks about *nágli*:—

"*Nágli* forms with *kodra* the staple food of the *Káliparaj* population of *Párdi* and *Balsár* *tálukas* and is eaten in the shape of *rotlo* or unleavened bread; an adult male is estimated to consume 1½ *ser* of *nágli* a day with one *ser* *kodra* prepared as *pej* or porridge. When wages are paid in kind to labourers, 6† *ser*s of *kodra*, 5 *ser*s rice in husk or 3 *ser*s of *nágli* is the usual rate per day.

"A *nágli* crop has the reputation of exhausting the soil; it is usually followed by at least one year's fallow; the only exception to this practice being in the case of areas with unusual facilities for copious manuring, e.g., lands in the possession of *Bharvads* or shepherds, or *adhars*, i.e., rābed nursery beds for rice seedlings. In the latter case it is mixed with *tuver*, *kodra*, &c. The *nágli* crop selected in this and the two following experiments may be taken as representative of about 50 per cent. of the area under *nágli* in the respective villages and the results of fairly careful tillage. The other 50 per cent. is greatly inferior, usually raised from broadcasted seed by *Káliparaj* cultiva-

* This must be a great exaggeration.

† Mr. D'Souza is not very clear, but presumably he means 6 *ser*s *kodra* plus 5 *ser*s rice or 3 *ser*s *nágli*.

tors with little or no preparatory tillage. This system of cultivation may be described as trusting to Providence and is hardly a fit subject for experiment."

It would, however, have been interesting to see what the outturn of such cultivation actually was. In all these experiments the assessments are low.

Experiment No. 143.—*Nágli* at Umarsádi. The field measures 4 acres 14 gunthas and is assessed at Rs. 3-2 or Re. 0-11-6 per acre. Part of the field, varying in different years from 14 to 34 gunthas, is under rice with a second crop; the rest under *kodra* or *nágli* or other such crops. The season is said to have been favourable and the cultivation good. Local anna estimate is 14.* The soil is *káli besar dádriváli* or stony ground. The seed rate is given as 2½ lbs. per acre, broadcasted on a rábed seed-bed and transplanted in August. *Nágli* was sown this year on 3 acres 30 gunthas and for this area the seed-bed measured 16 gunthas, and on it 9½ *seers* seed were put, 2½ lbs. and 4¼ gunthas per acre of transplantation. The seed-bed was weeded 8 days after sowing by 4 men. The field itself was not manured. It was ploughed four times and the seedlings were put into holes made with a pointed bit of *bámboo*. The field was once weeded. The crop is harvested by picking the pods; the straw being of little or no value is in many cases left uncut in the field and is eaten in the hot weather when fodder is scarce by buffaloes only or is used as ráb material. In these experiments the byproducts have not been valued. The outturn was 1,184 lbs. grain per acre valued, at 40½ lbs. to the rupee, at Rs. 29-3-9 and the incidence of assessment comes to 2·45 per cent.

Experiment No. 144.—The whole field measures 4 acres 12 gunthas and is assessed at Rs. 6-10 or Re. 1-8-8 per acre. About one acre of it belongs to a sub-sharer who has planted *nágli* in the whole of his share. Six pounds seed were sown on a seed-bed of 4 gunthas which had been rábed. Five loads of cattle manure weighted down with a layer of two cart-loads of rubbish, *kodra* stalks, &c., were burnt and then the bed was twice ploughed at the first rains. Seed was broadcasted and covered with a levelling board. The bed was not weeded. The field has not been manured since 1892-93 after a crop of sugarcane had been taken from it; it was ploughed 4 times and levelled with a board twice, this being necessitated by the amount of weeds in the field. Seedlings were transplanted in August. The crop was weeded twice, once in August and again in September.

Mr. D'Souza remarks that there were better crops in the village, but this one represents the average of the season in the village where most of the manure and labour goes to rice and sugarcane. He estimates this crop at 12 annas, but from these remarks and the statement that the season was good I imagine that 16 should be the proper entry.

The soil is called *besar*. The field appears to grow sugarcane once every 5 years. It also grows brinjals, broadcast rice, *vál*, *kodra*, *tuvér* and *udid* (*Phaseolus radiatus*). The outturn was 827 lbs. grain per acre valued at Rs. 20-6-11 and the incidence of assessment comes to 7·54 per cent.

Maximum dry crop rate for Palsána is Re. 1-12.

Experiment No. 145.—The third and last experiment on this crop was at Sukhláv. The field measures 38 gunthas and is assessed at 15 annas or Re. 0-15-9 per acre. The soil is *besar* and the cultivation is described as good. This year, of the total area, 20 gunthas were under *nágli* and 18 were *padtar*† (under grass). Last year 32 gunthas grew *nágli*. For three years before that the whole field grew *nágli* and for 5 years before that 24 gunthas were under *nágli* and the rest under grass. Seed was sown at the rate of 5 lbs. in 5 gunthas of seed-bed per acre. The bed was rábed, apparently as much as 12½ loads of manure per acre (*i.e.*, for the 5 gunthas of seed-bed) being used. Seventy goats and sheep are said to have been folded in the field for 2 months. It was twice ploughed. Seedlings were transplanted in August. The field was weeded once in September. The crop is estimated at 16 annas. The total outturn per acre being 1,845 lbs. grain valued, at 40½ lbs. per rupee, at Rs. 45-8-10. The incidence of assessment comes to the low percentage of 2·16. Mr. D'Souza remarks that the crop was a good one, but not better than a good many neighbouring fields cultivated by Bharwáds of the village.

*The anna estimate ought probably to be 16 annas.

†Mr. D'Souza says "fallow," but the original word in Village Form No. III is undoubtedly *padtar*, which means much more often "under grass" than fallow.

Sukhláv (group II) maximum dry-crop rate is Rs. 1-12.

The three experiments on *náglí* are shown together thus :—

Field.	Outturn of grain per acre.	Gross value of produce.	Assessment per acre.	Percentage incidence of assessment.
	Lbs.	Rs. a. p.	Rs. a. p.	
Survey No. 761 (Exp. No. 143) ...	1,184	29 3 9	0 11 6	2.45
Survey No. 61 (Exp. No. 144) ...	827	20 6 11	1 8 8	7.54
Survey No. 171 (Exp. No. 145) ...	1,845	45 8 10	0 15 9	2.16

I now turn to Mr. D'Souza's four experiments on sugarcane.

Experiment No. 146.—An experiment on a mixture of Malbári and Kálíbhur sugarcane at Kachwál. The survey number measures 7 acres 18 gunthas and is assessed at Rs. 14-12 or Re. 1-15-8 per acre. Included in the Rs. 14-12 is a sum of Rs. 6-12 *Bágáyat kasar* or well rate payable in respect of an old well which has since tumbled down; and was originally in another field. At present there is a new *pakka* well in the number from which the cane was watered. The soil is classed as *Bágáyat* and is a fine *gorádu* loam; it is situated in a loop formed by the Pár river and shows, Mr. D'Souza says, indications of alluvial accretions from that river. It cannot, that officer thinks, be classed as *Bháta*, because it is situated "higher than the highest flood level." The soil probably is ordinary *Bháta*, and I am rather surprised that it was not classed at the original survey as such.

Sugarcane has been tried on several portions of this number for the last ten years. The area under the cane now is about 4 acres. Before beginning to grow cane, about 400 cart-loads per acre of tank mould and fresh soil from a mango grove were carted on to the field.

The crop is a mixture in equal proportions. In June 1894 the land was ploughed and *san* was sown, $1\frac{1}{2}$ maunds per acre. This was dug in when a couple of feet high and the land was several times ploughed and bullock-hoed by a *champan*, and the larger clods crushed by a *mogri* or hand-mallet. The cane was planted by plough (*nágar*). The cane passing through the drill is deeply embedded in the furrows about 8 inches down. The land is again ploughed. Over an acre† 1,500 *sántas* of cane were planted. A *sánta* is a unit of six *háths* of cane and may include two or even three canes. Mr. D'Souza says the price for Malbári *sántas* was Rs. 35 and for Kálíbhuri Rs. 30 per thousand.

Nothing was done to the crop till the shoots had appeared well above the ground. It was then watered. Ten waterings were given up to June and three hand-hoeings and weedings. It may be noticed that in all Mr. D'Souza's experiments the number of operations said to have been performed is very great. It may perhaps be open to a little doubt whether really so many as ten waterings were given to the sugarcane. The crop is considered as a 16-anna one.

The outturn figures are as follows :—

	Per 2 gunthas.	Per acre.
Number of canes ...	1,125	22,500
	Lbs.	Lbs.
Weight of canes ...	4,132	82,640
Weight of juice ...	3,124	62,480
Market weight of Gol... ..	505	10,100
Net weight of Gol ...	473	9,460
Weight of dry leaves ...	377	7,540
Weight of green tops ...	144	2,880
	Rs. a. p.	Rs. a. p.
Price of Gol at Re. 1-12 per maund.	22 15 6	459 8 9
Price of dry leaves at Re. 1 per 100 bundles.	0 7 2	9 0 0
Total value of yield ...	23 6 8	468 8 9

* 1,850 is the ordinary rate.

*Incidence of assessment ...	... 0.42 per cent. or 0.84 per cent. for two years.
Percentage of juice to cane ...	... 75.60.
„ Gol to juice ...	... 15.14.
„ Gol to cane ...	... 11.44.
Weight of 100 Malbári canes stripped ...	426.3 lbs.
„ „ Kálíbhuri „ „	... 308.3 „

Percentage of yield for the two varieties is not given separately. It would have been interesting to compare them.

Mr. D'Souza gives a number of scattered figures and statements as to expenditure, but does not collect them so as to show the cost of cultivation. I have gathered them together as best as I can, and give them here.

Item.	Amount.			Remarks.
	Rs.	a.	p.	
Government assessment ...	1	15	8	Only <i>san</i> seed used.
Manure ...	1	0	0	750 Malbári canes at Rs. 35 per thousand and 750 Kálíbhuri canes at Rs. 30.
Seed....	49	0	0	
Share of cost of carting fresh soil ...	4	0	0	
16 ploughings (16 pairs bullocks, 32 men).	16	8	0	A pair of bullocks at annas 12, 1 man at $2\frac{1}{4}$ annas, or 2 annas and 3 pies worth tobacco.
4 bullock-hoeings (4 pairs bullocks, 8 men)	4	2	0	
Planting cane do. ...	4	2	0	
10 waterings (53 pairs bullocks, 107 men)	54	12	0	Watering was done by 2 <i>kos</i> or bags; each <i>kos</i> requires 2 pairs bullocks per day and 4 men were employed, 2 at the <i>kos</i> and 2 in the field; about $\frac{3}{4}$ acre can be watered in a day.
3 hand-hoeings and weedings (18 men) ...	2	4	0	
8 loads thorns at 2 annas per fence ...	1	0	0	
Labour 8 carts at 4 annas and 16 men ...	4	4	0	
Watching 5 months at Re. 1 ...	5	0	0	
Wear and tear of well apparatus ...	7	8	0	Rope and <i>kos</i> cost Rs. 15 and last 2 seasons.
Interest on cost of well at 9 per cent. ...	18	0	0	Original cost Rs. 200.
Crushing, &c.; 14 men at 4 annas each; 8 pairs bullocks at 10 annas for 6 days.	51	0	0	Men are paid 4 annas a day for their work. One pair of bullocks at 8 annas plus 2 annas for grass plus what he will eat of green tops.
Hire of mill at Re. 1 per day for 6 days...	6	0	0	
Price of earthen pots at Rs. 5 per 100 including cartage.	12	8	0	
Oil for lubricating mill ...	0	2	6	
Extra fuel for boiling Golat anna 1 per maund of Gol.	16	0	0	
Total cost of cultivating one acre ...	259	2	2	

If we added a liberal manuring the cost of cultivation would come to approximately Rs. 300 per acre, but even thus there is a pretty large margin of profit.

Experiment No. 147.—The sugarcane is a mixture of Malbári and Kálíbhuri cane in the ratio of 3 : 1. The field measures 1 acre 36 gunthas and is assessed at Rs. 2-12. Twenty-three gunthas of the field are *kiári* or rice land and 1 acre 13 gunthas Jiráyat. The former is assessed at Rs. 2 and the latter at annas 12. This year the cane has been grown on about one acre of the Jiráyat portion, so

* Mr. D'Souza takes 2 years' assessment and gives the incidence at 0.84 which is fairer.

that the average assessment of the land under experiment is annas 9 per acre. About 10 years ago cane was grown on the whole number. The land is irrigated from a private well dug since settlement. Mr. D'Souza remarks that no land in the village appears to have been classed as Bágáyat, probably because of the difficulties of irrigation. What these difficulties are is not stated. The present experiment is proof that they are not insuperable.

The Khátedár, a hard-working and intelligent Dhodia cultivates the land. Sub-letting for sugarcane is rare; average sub-letting rate in the village is stated to be Rs. 25 per acre. I gather that Mr. D'Souza means for one year's sugarcane cultivation. The soil is good *gorádu* loam. It is very lightly assessed.

In June 1894 the field was twice ploughed, and 3 maunds of *san* seed were broadcasted. The *san* was dug in when of proper height. The field was prepared for cane by 10 ploughings and 2 log harrowings. Cane was planted with the plough in December, only 1,500 *sántas* per acre being sown. The seed was grown by the cultivator himself. No watering was given till February. Ten waterings and 2 hand-hoeings and weedings are said to have been given before the rains. A thorn fence was made with 8 cart-loads of thorns and the crop was watched by the cultivator himself.

Crushing was done by a three-roller wooden mill. Such a mill costs about Rs. 50 for wood and carpenter's labour and is very slow at work and constantly liable to accident, causing suspension of operations till the Sutár arrives to repair it. The juice expressed is said, however, to be purer and the *gol* finer, but Mr. D'Souza suspects that this is a mere fancy.

The outturn is called a 20-anna one. The Malbári canes are three times as numerous as the Kálibhuri. The following represents the outturn, &c. :—

	Per 2 gunthas.	Per Acre.
Number of canes ...	956	19,120
	Lbs.	Lbs.
Weight of stripped canes ...	4,063	81,260
Weight of juice ...	2,845	56,900
Market weight of Gol ...	544	10,880
Net weight of Gol ...	501	10,020
Weight of dry leaves ...	227	4,540
Weight of green tops ...	216	4,320
	Rs. a. p.	Rs. a. p.
Price of Gol at Re. 1-12 per maund ...	24 12 2	495 4 0
Price of dry leaves at Re. 1 per hundred bundles...	0 6 10	8 9 7
Total price of produce ...	25 3 0	503 13 7
*Incidence of assessment 0 11 per cent.		
Percentage of juice to cane...	70 02	
Do. Gol to juice ...	17 60	
Do. Gol to cane ...	12 33	

Experiment No. 148.—This and the next experiment were both taken at Palsána. The survey number of this experiment measures 1 acre 27 gunthas and is assessed at Rs. 22-8 or Rs. 13-6-11 per acre. The field is *kiári* or rice land, and there is a tank water rate of Rs. 8-6 on the whole number which is included in the assessment of Rs. 22-8.

The field grows sugarcane every four or five years and at other times rice followed by a second crop of *vál*. The soil is said to be black soil. The crop is estimated at 16 annas. It was rather uneven, and so two separate patches of one guntha each were cut. Of the whole number sugarcane occupies one acre. The crop was a mixture, in equal proportions, of Malbári and Kálibhuri. On the acre 20 loads of farm-yard manure were spread in the hot weather of 1894. After two ploughings rice was sown broadcast and harvested in October. Then about 15 ploughings and cross ploughings were given, and 3 log harrowings with the *champan*. Cane was planted by the plough in November and 1,500 *sántas* were used per acre. The field was then immediately† flooded. Two more

* Mr. D'Souza takes two years' assessment, which gives the incidence as 0·22 per cent.

† Mr. D'Souza does not say whence the water came, but presumably from a well.

ploughings were given and the field was weeded. The next watering was given at the end of January and seven more waterings were given till the rains, with 3 hand-hoeings and weedings. In September one *khandi* of castor cake, at Rs. 10 per *khandi*, a high rate, was applied to parts of the field, and this, Mr. D'Souza thinks, accounts for the unevenness of the crop. The field was fenced and watched by a servant, but jackals did a good deal of damage in parts. Crushing was done with an iron mill.

The outturn figures are given below :—

			Per 2 gunthas.	Per acre.
Number of canes	...	...	963	19,260
			Lbs.	Lbs.
Weight of stripped canes	...	...	4,073	81,460
Weight of juice	...	...	2,137	42,740
Market weight of Gol	...	...	448	8,960
Net weight of Gol	...	...	416	8,320
Weight of dry leaves	...	...	331	6,620
Weight of green tops	...	...	87	1,740
			Rs. a. p.	Rs. a. p.
Price of Gol at Re. 1-14 per maund	...	...	21 13 6	436 14 0
Price of dry leaves at Re. 1 per 100 bundles.			0 8 6	10 9 7
Total price	...	...	22 6 0	447 7 7
Incidence of assessment	...	...	3-00	per cent.
Percentage of juice to cane	...	...	52-46	"
„ Gol to juice	...	...	19-46	"
„ Gol to cane	...	...	10-21	"

The percentage of juice to cane is very low, but of *gol* to juice is high.

Experiment No. 149.—In this experiment the mixture was Malbári and Khajuria in the proportion of 1:3. The experiment was made to ascertain how many canes are required as seed per acre and what is the area required to furnish any given area with seed. *Gol* was not made. Mr. D'Souza says: "The crop of one guntha was cut, stripped, but the heads allowed to remain, useless stumps and diseased canes were separated, and both they and the whole canes used for seed were counted. Then the seed canes were measured roughly by the village measurer by hand so as to ascertain the number of *sántas* used. A *sánta* is supposed to be 6 cubits (*hátthas*) or 9 feet length of cane, but in practice is a good deal more. The number of canes was 470 and these gave 138 *sántas*, about 3 canes thus making a *sánta*. The canes were then carted to the field, *i.e.*, the field to be planted, Survey No. 311, where a fixed area of 5 gunthas was measured and were planted by *nágar* in the ordinary way.

"The *nágar* as is well known is a large plough with a drill or tube attached to it; the tube is so placed that as the *nágar* is worked the canes are left imbedded at a depth of about 9 inches in the furrows. Whole canes are placed in the tube, and as the top portions are unlikely to germinate, the supply is so regulated that about a cubit of the next cane is made to cover the top end of the previous one. Six pairs of bullocks and buffaloes worked the *nágar*, and 12 men were employed, seven to drive, one to place the canes, and four to carry them.

"The area planted was then measured and found to be $3\frac{1}{2}$ gunthas. This is a small area to transplant out of one guntha, but the crop was a thin one, estimated at 12 annas, and the individual canes were small as the Khajuria variety preponderated. But from the experiment it appears that 138 *sántas* are required to plant $3\frac{1}{2}$ gunthas or say 1,580* per acre, which corresponds as

* Mr. D'Souza writes 1,700; but this appears to be a slip. It, however, rather vitiates his argument, for 1,580 does not correspond particularly closely to 1,860 which is the acre rate of 62 per *vása* (3 *vásas*=4 gunthas) or (taking the Bigha equal to 27 gunthas) of 1,250 per Bigha. It, however, is near the rate of 1,500 *sántas* which Mr. D'Souza has taken in some of his experiments.

closely as can be expected with the 62 *sántas* per *vása* of Balsár táluka and 1,250 *sántas* per Bigha of Chikhli."

The price per 1,000 *sántas* is Rs. 35; dry leaves and stumps have been roughly valued. The total value of the acre yield only comes to Rs. 208-3-2. Mr. D'Souza supposes that it would have yielded Rs. 308-3-2 had it been manufactured into *gol*. He adds Rs. 100 for the cost of harvesting, manufacturing and replacing wear and tear of machinery and interest on capital, which is quite a large enough allowance. The crop was a poor one and Mr. D'Souza says he took a test on it as it was the only one about to be planted during his stay in the village. Had he only weighed the canes, besides counting them, we should have been able to calculate, from the average percentages furnished by other experiments, very approximately the probable yield of *Gol*.

Twelve gunthas of the field including the portion that was cut had been prepared as the seed-bed for *Kada* rice and manured with 15 cart-loads of farm-yard manure and rábed. Seedlings were transplanted into the seed-bed also and the *Kada* was harvested in October. Then the field was prepared for sugarcane by 16 ploughings and 3 harrowings with the *champan*. Cane was then planted in November. No watering was given till February and in all 6 waterings and 4 hand-hoeings and weedings were given till the rains. A top dressing of one *khandi* of castor cake at Rs. 9 per *khandi* was given to this 12 gunthas. A fence of thorns was made and the crop watched for Rs. 4.

I tabulate together the results of the three experiments in this táluka on the mixture of Malbári and Kálibhuri canes:—

Field.	Net weight Gol.	Value of produce per acre.	Assessment per acre.	Percent- age in- cidence of assess- ment.	Per- centage juice to cane.	Percent- age of Gol to juice.	Percent- age of Gol to cane.
	Lbs.	Rs. a. p.	Rs. a. p.				
Survey No. 214 (Exp. No. 146).	9,460	468 8 9	1 15 8	0.42	75.60	15.14	11.44
Survey No. 341 (Exp. No. 147).	10,020	503 13 7	0 9 0	0.11	70.02	17.60	12.33
Survey No. 60 (Exp. No. 148).	8,320	447 7 7	13 6 11	3.00	52.46	19.46	10.21
Average	9,267	473 4 8	*...	*...	66.07	17.27	11.33

* Fair average cannot be got, as one field is highly assessed Bágayat and two are lightly assessed Jiráyat lands.

There were 6 experiments recorded before this year which I have added to the tabular statement.

[Signature]

C. N. SEDDON,
Assistant Collector, on Special Duty.

APPENDIX A.

The following table gives certain information about 7 chief crops in the Surat District. The figures have been calculated from all the experiments, conducted this year and before, in the district:—

Crop.	Seed rate per acre.	Outturn of principal product per acre.	Price of principal product per rupee.	Value of total yield per acre.	Present assessment per acre.	Percentage incidence of assess- ment.
	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
Juvár... ..	8 $\frac{2}{3}$	825	42 $\frac{3}{5}$	24 11 5	4 7 0	17.95
Cotton	15	361 $\frac{1}{2}$	11 $\frac{7}{13}$	31 5 3	5 4 4	16.82
Inferior rice (Kada, &c.) ...	128	2,014	49 $\frac{1}{3}$	45 1 3	10 11 7	23.78
Superior rice (Kolamb, Ban- gáliu, Jhinu Sálu, &c.) ...	94	2,113	38 $\frac{6}{7}$	60 5 11	13 12 4	22.81
Vál (as second crop) ...	66 $\frac{7}{8}$	658	55 $\frac{1}{2}$	18 1 10	11 2 5	61.55
Sugarcane (for Gol)... ..	1,885 canes or 17,800 sets.	7,920 Gol.	19 $\frac{1}{3}$	432 2 7	11 10 7	2.69
Sugarcane (for eating) ...	9,193 sets.	35,318 canes.	147 canes about.	240 2 4	15 10 4	6.51

The incidences for rice and *vál* are for the single crop. The average incidence of assessment on the average double crop of rice and *vál* is 16.51 per cent.

The total value for *juvár* includes the value of the subsidiary pulses, considerable in Chikhli, small elsewhere this year. The reason why *juvár* lands appear to be assessed more lightly than cotton lands is that *juvár* is grown in Chikhli while cotton is not.

APPENDIX B.

The following statement gives the average for the *gol* making sugarcane of the district:—

					Lbs.
Weight of stripped canes per acre	...	...	...	...	72,618
Do. juice do.	...	...	...	...	47,627
Do. Gol do.	...	...	...	...	7,920
					Rs. a. p.
Value of crop per acre (at rates ruling when the several experiments were made)	...	...	...	...	432 2 7
Percentage of juice to cane	...	...	...	...	65.58
Do. Gol to juice	...	...	...	...	16.62
Do. Gol to cane	...	...	...	...	10.90

There are in all 9 chief varieties of cane grown in the district:—*Surti Meva*, *Malbári*, *Vánsi*, *Ráti* or *Káli*, *Kálibhuri*, *Khajuria*, *Phojbhuri*, *Máni*, *Lákadia* or *Kásda*. By far the commonest cane for *gol* production is *Malbári*.

APPENDIX C.

The following information with regard to the weights and measures current among agriculturists in the Surat district may be useful.

The unit of weight is the *ser* composed of $37\frac{1}{2}$ *tolas*.

$37\frac{1}{2}$ <i>tolas</i>	...	... = 1 <i>ser</i> .
40 <i>ser</i> s...	...	... = 1 <i>man</i> or maund = $38\frac{1}{2}$ lbs. about.
20 <i>mans</i>	...	... = 1 <i>khandi</i> .
7 <i>mans</i>	...	... = 1 <i>háro</i> (in Jalálpor).
21 <i>mans</i>	...	... = 1 <i>háro</i> (in Balsár).
30 <i>mans</i>	...	... = 1 (<i>juvár</i>) <i>gáli</i> .
$31\frac{1}{2}$ <i>mans</i>	...	... = 1 (rice) <i>gáli</i> .
24 <i>mans</i>	...	... = 1 (cotton) <i>bhár</i> .

Vegetables, oil, &c., are sold by the *khandi*. Rice, *kodra* and castor seed in the north by the *háro* of 7 maunds, and in the south by the *gáli* of $31\frac{1}{2}$ maunds. *Juvár*, *bájrí*, wheat, *tuver*, *mag*, *math*, *vál*, *vatána*, gram, *láng*, by the *gáli* of 30 maunds; cotton by the *bhár* of 24 maunds; farm-yard manure by the cart-load; dried fish manure by the basketful; sugarcane seed by the thousand *sántas* or *sherdís* of 6 *háths* each. Each *háth* measures approximately 18 inches.

The unit for land measurement is the *vása* composed of 20 *visnavis*. 20 *vásas* make 1 *vingha* (or *bigha*) and the *vingha* varies from 23 to 27 gunthas. In converting Surati areas into British, 3 *vásas* are considered roughly equal to 4 gunthas.

TABULAR SUMMARY.

Summary of Crop Experiment Reports

Figures in columns 5 and 13

No.	Taluka, Village and Experimenter.	Survey Number or Pot Num- ber.	Net area exclud- ing Pot Kharáb.	Assessment of the Field.	Crop and Date of Experiment.	Local Esti- mate in Annas.	Yield accord- ing to Formu- la.	AVERAGE PER		
								Seed.	Yield of	
									Principal Product.	By-Product.
1	2	3	4	5	6	7	8	9	10	11
			A. g.	Rs. a. p.		Annas.	Lbs.	Lbs.	Lbs.	Lbs.
	Mr. C. N. Seddon, Assistant Collector.									
1	Bárdoli (Goji) ...	36 Pot No. 1	1 11 0 33	3 12 0 2 8 0	Sorghum vulgare (Juvár) mixed with Cajanus indicus (Tuver), 13th December 1895, and Doli- chos lablab (Vál), 9th March 1896.	16	1,200	15 1 3½	870 4 113	260 bundles Kadbi. 90 J u v á r heads. 192 Vál stalks (Gotar).
2	Do. (do.) ...	71	9 13	19 8 0	Sorghum vulgare (Juvár) mixed with Cajanus in- dicus (Tuver) and Phaseolus mungo (Mag), 14th December 1895.	8	600	16 5 3½	291 128 35	190 bundles Kadbi. 45 J u v á r heads. 20 light Juvár grain. 60 T u v e r husks.
3	Do. (Aphwa) ...	70 Pot No. 2	9 19 1 12	35 0 0 5 0 0	Sorghum vulgare (Juvár) mixed with Cajanus in- dicus (Tuver) and Phaseolus mungo (Mag), 17th December 1895.	12	900	8 3½ 1½	874 144 26	320 bundles Kadbi. 90 J u v á r heads. 90 chaff. 17½ light Juvár grain. 101 T u v e r husks.

Surat District, 1895-96.

are of the Original Survey.

ACRE.			Area of Test.	Equivalent in Tolas of local weight Ser.	PRICES OF PRODUCE PER RUPEE		REMARKS.
Total Value of Produce.	Assessment, excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.			Principal Product.	By-Product.	
12	13	14	15	16	17	18	19
Rs. a. p.	Rs. a. p.	Per cent.	A g.	Tolas.	Lbs.	Cwts.	
23.. 9 1	3 0 6	12.89	0 8	37 $\frac{1}{2}$	48 juvâr; 38 $\frac{1}{2}$ tuver; 57 $\frac{2}{3}$ vâl.	200 bundles kadbî; 3 $\frac{2}{3}$ juvâr heads; 1 $\frac{13}{14}$ gotar.	Experiment No. 1.—A good field near the village-site.
11 14 1 ...	2 1 6	17.62	0 8	Do.	48 juvâr; 38 $\frac{1}{2}$ tuver; 44 $\frac{2}{3}$ mag.	267 bundles kadbî; 2 $\frac{2}{3}$ juvâr heads; 1 $\frac{1}{7}$ light juvâr grain. 1 $\frac{1}{2}$ tuver husks.	Experiment No. 2.—A poor field far from the village site.
25 2 6	3 13 6	15.28	0 8	Do.	48 juvâr; 38 $\frac{1}{2}$ tuver; 44 $\frac{2}{3}$ mag.	256 bundles kadbî; 2 $\frac{2}{3}$ chaff and heads; 1 $\frac{1}{2}$ light juvâr grain; 1 $\frac{13}{14}$ tuver husks	Experiment No. 3.—Anna estimate probably too low.

Summary of Crop Experiment Reports.

Figures in columns 5 and 13

No.	Taluka, Village and Experimenters.	Survey Number or Pot Number.	Net area excluding Pot Kharab.	Assessment of the Field.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formulae.	AVERAGE PER		
								Seed.	Yield of	
									Principal Product.	By-Product.
1	2	3	4	5	6	7	8	9	10	11
			A. g.	Rs. a. p.		Annas.	Lbs.	Lbs.	Lbs.	Lbs.
	<i>Mr. C. N. Seddon, Assistant Collector—continued.</i>									
4	Bardoli (Aphwa) ...	152 Pot No. 1	5 26 3 16	21 0 0 12 4 0	Cotton (Three pickings). 8th February to 9th March 1896.	16	450	21	365 Seed cotton.	.....
5	Do. (Goji) ...	69	5 34	14 8 0	Do. (Four pickings). 25th January to 9th March 1896.	16	450	Un- known	312 Seed cotton.	.....
6	Do. (Sarbhán) ...	349 Pot No. 1	6 6 2 32	30 0 0 14 4 0	Do. (Four pickings). 27th January to 11th March 1896.	16	450	16 to 17	296 Seed cotton.	.....
7	Do. (do.) ...	358	7 11	24 8 0	Do. (Four pickings). 27th January to 11th March 1896.	14	390	16 to 17	187 Seed cotton.	.....
8	Do. (do) ...	223 Rice.	4 12 3 33	57 8 0 55 6 0 (13 2 4 water rate).	Rice (Kada), 17th October 1895.	8	1,160	90	1,470 in husk.	1,580 bundles.
9	Do. (do.) ...	299 Pot No. 1	2 19 2 14	46 0 0 (18 9 0 water rate). 43 8 0	Rice (Kolamb), 16th November 1895; followed by	8	1,160	115	2,477 in husk.	2,850 bundles.
10	Do. (do.) ...	Do. ...	Do. ...	Do. ...	Dolichos lablab (Vál) and Castor seed, 20th March 1896.	12	560	85 4 (	599 16 Seed.	865
11	Do. (do.) ...	302	1 15	23 8 0 (8 9 6 water rate).	Rice (Kolamb), 16th November 1895; followed by	8	1,160	Un- known.	1,381 in husk.	2,750 bundles.
12	Do. (do.) ...	Do. ...	Do.	Do. ...	Dolichos lablab (Vál), 26th March 1896.	16	750	Un- known.	482	692

Surat District, 1895-96—continued.

are of the Original Survey.

ACRE.			Area of Test.	Equivalent in Tolas of local weight Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
Total Value of Produce.	Assessment excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.			Principal Product.	By-Product.	
12	13	14	15	16	17	18	19
Rs. a. p.	Rs. a. p.	Per cent.	A. g.	Tolas.	Lbs.	Cwts.	
31 10 8	3 9 8	11.33	0 8	37½	11 ⁷ / ₁₃	...	Experiment Nos. 4-7.—These cotton crops may safely be taken as average crops for the fields. Here and everywhere in the report the figures in column 10 are for seed cotton, not for clean cotton.
27 1 4	2 7 9	9.17	0 8	Do.	11 ⁷ / ₁₃	...	
25 10 0	5 1 5	19.85	0 8	Do.	11 ⁷ / ₁₃	...	
16 4 0	3 5 11	20.73	0 8	Do.	11 ⁷ / ₁₃	...	
32 9 10	14 7 8	44.39	0 10	Do.	51½	400 b u n- dles.	Experiment No. 8.—This year there was no second crop as the rice was followed by sugarcane. Incidence is therefore on the single crop. But the field always grows a second crop of <i>vál</i> and castor, or else it grows sugarcane.
71 8 3	18 8 2	25.88	0 4	Do.	38½	400 b u n- dles.	Experiment Nos. 9 and 10.—Anna estimate probably too low for rice. Incidence on double crop 20.53 per cent.
18 10 3	Do.	99.30	0 4	Do.	57 ² / ₃ vál. 21 ¹ / ₉ castor seed.	1	
42 12 6	17 1 5	39.94	0 4	Do.	38½	400 b u n- dles.	Experiments Nos. 11 and 12.—Incidence on the two crops 29.91 per cent.
14 5 7	Do.	119.09	0 4	Do.	57 ² / ₃	1	

Summary of Crop Experiment Reports,

Figures in columns 5 and 13

No.	Táluka, Village and Experimenter.	Survey Number or Pot Number.	Net area excluding Pot Kharáb.	Assessment of the Field.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formulae.	AVERAGE PER		
								Seed.	Yield of	
									Principal Product.	By-Product.
1	2	3	4	5	6	7	8	9	10	11
			A. g.	Rs. a. p.		Annas.	Lbs.	Lbs.	Lbs.	Lbs.
<i>Mr. C. N. Seddon, Assistant Collector—continued.</i>										
13	Bárdoli (Sarbán) ...	300	1 15	23 8 0 (8 9 6 water rate).	Rice (Bangálin), 16th November 1895; followed by	10	1,450	Un- known.	2,457 in husk.	3,750 bundles.
		Pot No. 5	0 19	8 0 0						
14	Do. (do.) ...	Do. ...	Do.	Do. ...	Dolichos lablab (Vál), 26th March 1896.	16	750	160	274	480
15	Do. (do.) ...	226	2 5	38 8 0 (15 4 4 water rate).	Rice (Kolamb), 16th November 1895; followed by	12	1,750	95	2,517 in husk.	2,304 bundles.
		Pot No. 3	1 19	26 12 0						
16	Do. (do.) ...	Do. ...	Do.	Do. ...	Wheat (Potá), 9th March 1896.	10	610	80	927	192
17	Do. (Bárdoli) ...	106	1 16	17 8 0	Rice (Sálin), 16th October 1895; followed by	8	1,160	85	786 in husk.	1,090 bundles.
18	Do. (do.) ...	Do. ...	Do.	Do. ...	Dolichos lablab (Vál), 8th March 1896.	5	225	73	430	438
19	Do. (Aphwa) ...	7	1 23	19 8 0	Rice (Jhinu Sá- lia), 29th Octo- ber 1895; followed by	16	2,325	73	1,119 in husk.	1,350 bundles.
		Pot No. 2	0 37	11 8 0 (2 5 0 water-rate).						
20	Do. (do.) ...	Do.	Do.	Do.	Dolichos lablab (Vál) and Castor seed, 25th March 1896.	16	750	45 20	466 106 Seed.	720
21	Do. (Pani) ...	132	3 35	67 0 0	Rice (Kada), 17th October 1895.	8	1,160	96	762 in husk.	1,855 bundles.
22	Do. (Aphwa) ...	266	0 24	5 8 0	Rice (Kada), 18th October 1895.	12	1,750	96	1,460 Do.	1,500 Do.

Surat District, 1895-96—continued.

are of the Original Survey.

ACRE,			Area of Test.	Equivalent in Tolas of local weight Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
Total Value of Produce.	Assessment excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.			Principal Product.	By-Product.	
12	13	14	15	16	17	18	19
Rs. a. p.	Rs. a. p.	Per cent.	A. g.	Tolas.	Lbs.	Cwts.	
73 4 3	16 13 6	22.99	0 4	37½	38½	400 bundles.	Experiment Nos. 13 and 14.—Anna estimate probably rather low for rice but correct for <i>vál</i> . Incidence on the double crop 20.49 per cent.
8 14 8	Do.	188.90	0 4	Do.	57½	1	
71 3 5	18 2 2	25.46	0 20	Do.	38½	400 bundles.	Experiment Nos. 15 and 16.—Anna estimate probably slightly low for rice and possibly slightly low for wheat, but fine wheat crops are got from these rice fields. Incidence on the double crop 15.86 per cent.
43 2 0	Do.	42.05	0 8	Do.	22	1½	
22 4 6	12 8 0	56.10	0 4	Do.	41	350 bundles.	Experiment Nos. 17 and 18.—Incidence of assessment on the two crops comes to 37.33 per cent.
11 3 2	Do.	111.62	0 4	Do.	57½	1	
31 0 6	12 6 11	40.06	0 8	Do.	41	360 bundles.	Experiment Nos. 19 and 20.—Rs. 2-5-0 of the assessment of the Pot number is for a well which is not used for rice, or indeed for any crop in this field. Percentage incidence on the two crops comes to 24.66.
19 5 11	Do.	64.18	0 8	Do.	57½ <i>vál</i> 21½ castor seed.	1	
19 8 1	17 4 8	88.65	0 8	Do.	51½	400 bundles.	Experiment No. 21.—The field always has a second crop. None this year owing to family difficulties. Incidence therefore on the first crop alone.
32 13 6	9 2 8	27.91	0 4	Do.	51½	343 bundles.	Experiment No. 22.—The field, usually but not always, grows a second crop of <i>vál</i> . None this year. Incidence therefore on the first crop alone.

Summary of Crop Experiment Reports,

Figures in columns 5 and 13

No.	Táluka, Village and Experimenter.	Survey Number or Pot Num- ber.	Net area exclud- ing Pot Kharáb.	Assessment of the Field.	Crop and Date of Experiment.	Local Esti- mate in Annas.	Yield accord- ing to Formu- lae.	AVERAGE PER		
								Seed.	Yield of	
									Principal Product.	By-Product.
1	2	3	4	5	6	7	8	9	10	11
			A. g.	Rs. a.		Annas.	Lbs.	Lbs.	Lbs.	Lbs.
	<i>Mr. M. B. Tyabji, Assistant Collector.</i>									
	<i>Bárdoli (Bábla) ...</i>	95	2 19	38 8 0 (10 0 0 water-rate).	<i>Dolichos lablab (Val), 5th March 1889.</i>	16	750	61	1,084	- 1,008 e a v e s 210 stalks.
	<i>Mr. A. G. Kotwal, District Deputy Collector.</i>									
	<i>Do. (Pera) ...</i>	155	1 37	15 0 0	<i>Castor seed, 2nd March 1892.</i>	12	340	45	458 Seed.	....
	<i>Do. (Tarbhán) ...</i>	175	7 35	25 12 0	<i>Castor seed, 16th March 1892.</i>	12	340	33	488 Do.	....
	<i>Mr. C. N. Seddon, Assistant Collector.</i>									
23	<i>Do. (Bárdoli) ...</i>	257	3 16	27 0 0	<i>Potatoes, 23rd Fe- bruary 1896.</i>	14	7,220	600	3,456	....
24	<i>Do. (do.) ...</i>	269	1 33	15 8 0	<i>Do. ..</i>	14	7,220	600	3,221	....
25	<i>Do. (do.) ...</i>	190	4 8	33 0 0	<i>Convolvulus bata- ta Sakaria, Sweet Potatoes). 24th February 1896.</i>	8	3,375	...	4,904	....
26	<i>Do. (do.) ...</i>	204	5 6	17 8 0	<i>Do. ...</i>	8	3,375	...	4,281	....
27	<i>Do. (do.) ...</i>	195	6 3	59 0 0	<i>Ginger (Adu), Tur- meric (Haldar) Yams (Ratálu) and Chillies (Marcha), 6th January 1896.</i>	12	2,810 1,690	1,400 1,120 840	3,377 2,564 1,880 102	....
28	<i>Do. (do.) ...</i>	194	5 27	55 0 0	<i>Ginger (Adu), Turmeric (Hal- dar), 7th Janua- ry 1896.</i>	14	3,275 2,975	1,700 340	8,337 2,564	....
29	<i>Do. (do.) ...</i>	239 Pot No. 1	5 28 3 10	51 0 0 29 2 0	<i>Sugarcane (dark or red), 6th January 1896.</i>	16	...	11,000 sets.	23,800 canes (num- be.).	...

Surat District, 1895-96—continued.

are of the Original Survey.

ACRE.			Area of Test.	Equivalent in Tolas or local weight Ser.	PRICE OF PRODUCE PER RUPEE.		REMARKS.
Total Value of Produce.	Assessment excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.			Principal Product.	By-Product.	
12	13	14	15	16	17	18	19
Rs. a. p.	Rs. a. p.	Per cent.	A. g.	Tolas.	Lbs.	Cwts.	
48 5 4	15 8 10	32.17	0 6	37	30 $\frac{1}{2}$	$\frac{6}{7}$	This and the following two experiments are on second crops after rice. Incidence in each case on the second crop alone. For detailed remarks, vide Experiment No. 13 of Report for 1888-89.
11 4 7	12 8	37.59	0 4	Do.	22 $\frac{1}{7}$	...	For remarks, &c., vide Experiment No. 23 of Report for 1891-92.
22 0 9	3 4 4	14.81	0 4	Do.	22 $\frac{1}{7}$	...	For remarks, &c., vide Experiment No. 24 of Report for 1891-92.
111 10 6	7 15 1	7.11	0 1 $\frac{1}{2}$	37 $\frac{1}{2}$	30 $\frac{3}{4}$	...	
104 11 0	8 7 11	8.11	0 1	Do.	30 $\frac{3}{4}$	...	
130 0 0	7 13 9	6.04	0 1	Do.	38 $\frac{1}{2}$	...	Experiment No. 25.—Seed rate cannot be given, see detailed remarks in the analysis.
112 8 0	3 6 4	3.02	0 1	Do.	38 $\frac{1}{2}$	...	Experiment No. 26.— Do. do.
88 10 8	9 11 5	10.96	0 2 $\frac{1}{4}$	Do.	64 $\frac{1}{10}$	...	Experiment No. 27.—Formulæ yields appear too low.
					ginger, 128 $\frac{1}{5}$ turmeric, 123 $\frac{1}{5}$ yams, 77 chillies.		
150 0 4	9 11 1	6.46	0 1 $\frac{5}{16}$	Do.	64 $\frac{1}{10}$	...	Experiment No. 28.— Do. do.
					ginger. 128 $\frac{1}{5}$ turmeric.		
240 0 0	8 15 5	3.73	0 1	Do.	120 canes.	...	Experiment No. 29.—The <i>kali</i> or <i>rati</i> sugarcane, generally used for <i>gol</i> , here cut for eating purposes.

Summary of Crop Experiment Reports,

Figures in columns 5 and 13.

No.	Taluka, Village and Experimenter.	Survey Number or Pot Num- ber.	Net area exclud- ing Pot Kharáb.	Assessment of the Field.	Crop and Date of Experiment.	Local Esti- mate in Annas.	Yield accord- ing to Formu- lae.	AVERAGE PER		
								Seed.	Yield of	
									Principal Product.	By-Product.
1	2	3	4	5	6	7	8	9	10	11
			A. g.	Rs. a. p.		Annas.	Lbs.	Lbs.	Lbs.	Lbs.
	Mr. Umedram Ran- choddás, District Deputy Collector.									
	Bardoli (Runira) ...	125	7 17	29 0 0	Wheat (Hansia), 16th February 1891.	12	730	66	1,129	1,433
	Do. (Bharampor) .	24	8 34	33 8 0	Do. do. ...	8	490	66	669	645
	Mr. A. G. Kotval, District Deputy Collector.									
	Do. (Rajyam) ...	13	5 27	23 12 0	Do. 1 20th February 1893.	8	490	76	624	427
	Mr. C. N. Seddon, Assistant Collector.									
30	Jalálpor (Vijalpor) ...	32 Pot No. 3	6 15 2 11	40 0 0 14 4 0	Sorghum vulgare (Chapti Juvár) mixed with Caju- nus indicus (Tuver) and Phaseolus mun- go (Mag), 21st December 1895	14	1,050	9½ 1½ ½	793 72 2½	375 bundles Kadbi; 26 light Juvár grain; 218 Juvár heads.
31	Do. (Eru) ...	32	5 26	24 8 0	Sorghum vulgare (Pirio Juvár) mixed with Caju- nus indicus (Tuver) and Phaseolus mun- go (Mag), 21st December 1895.	16	1,200	8½ 1½ 1½	865 43 29	275 bundles Kadbi; 16 light Juvár grain; 180 Juvár heads; 2 Tuver chaff.
32	Do. (Hansáper)...	200	4 39	16 8 0	Sorghum vulgare (Chapti Juvár) with Caju- nus indicus (Tuver) and Phaseolus mungo (Mag), 22nd December 1895.	12	900	14 2 2	453 10 24	190 bundles Kadbi; 16 light Juvár grain; 100 Juvár heads.

Surat District, 1895-96—continued.

are of the Original Survey.

ACRE.			Area of Test.	Equivalent in Tolas of local weight Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
Total Value of Produce.	Assessment excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.			Principal Product.	By-Product.	
12	13	14	15	16	17	18	19
Rs. a. p.	Rs. a. p.	Per cent.	A. g.	Tolas.	Lbs.	Cwts.	
45 3 9	3 14 6	8.63	0 8	37	30	$1\frac{11}{16}$	Dry-crop wheat land lately broken up for cultivation. For detailed remarks, vide Experiment No. 26 of Report for 1890-91.
25 11 5	3 12 7	14.73	0 8	Do.	30	$1\frac{11}{16}$	Dry-crop wheat land long tilled and unmanured. For detailed remarks, vide Experiment No. 27 of Report for 1890-91.
25 6 8	4 3 0	16.47	0 8	Do.	$24\frac{2}{3}$	5	Dry crop wheat on black soil. Yield much below taluka average. For detailed remarks, vide Experiment No. 48 of Report for 1892-93.
24 14 8	6 4 3	25.14	0 8	$37\frac{1}{2}$	42 juvâr, $38\frac{1}{2}$ tuver, $38\frac{1}{2}$ mag.	107 bun- dles kadbi.	
25 2 1	4 5 5	17.26	0 8	Do.	$42\frac{1}{4}$ juvâr $38\frac{1}{2}$ tuver, $38\frac{1}{2}$ mag.	107 bun- dles kadbi.	
13 11 4	3 5 1	24.20	0 8	Do.	42 juvâr, $38\frac{1}{2}$ tuver, $38\frac{1}{2}$ mag.	107 bundles kadbi.	Experiment No. 32.—An inferior soil field cultivated by a Koli.

Summary of Crop Experiment Reports,

Figures in columns 5 and 13

No.	Táluka, Village and Experimenter.	Survey Number or Pot Number.	Net area excluding Pot Kharab.	Assessment of the Field.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formula.	AVERAGE PER		
								Seed.	Yield of	
									Principal Product.	By-Product.
1	2	3	4	5	6	7	8	9	10	11
	<i>Mr. C. N. Seddon, Assistant Collector</i> —continued.		A. g.	Rs. a. p.		Annas.	Lbs.	Lbs.	Lbs.	Lbs.
33	Jalálpor (Jalálpor) ...	344 Pot No. 1	6 23 3 12	23 0 0 11 8 0	Sorghum vulgare (Pirio Juvár) with Cajanus indicus (Tuver) and Phaseolus mungo (Mag), 23rd December 1895.	14	1,050	14 $1\frac{2}{3}$ $\frac{5}{8}$	846 9 $7\frac{1}{8}$	240 bundles Kadbi; 11 light Juvár grain; 166 Juvár heads.
	<i>Mr. A. L. M. Wood, Assistant Collector.</i>									
34	Do. (Vijalpor) ...	33	4 19	28 0 0	Sorghum vulgare (Juvár), 16th December 1895.	16	1,200	11½	975	350 bundles Kadbi; 156 chaff.
35	Do. (Bodáli) ...	43	10 3	53 0 0	Do. 17th December 1895.	16	1,200	11½	1,327	345 bundles Kadbi; 231 chaff.
36	Do. (Sisodra) ...	332	5 33	18 8 0	Do. with Cajanus indicus (Tuver) and Phaseolus mungo (Mag), 4th January 1896.	16	1,200	13½ 2 1	499 43 7	230 bundles Kadbi; 88 chaff. 40 bundles Tuver stalks; 65 chaff; 23 Mag chaff.
	<i>Mr. C. N. Seddon, Assistant Collector.</i>									
37	Do. (Vijalpor) ..	75 Pot No. 1	7 10 1 30	42 8 0 10 4 0	Cotton (Four pickings), 30th January to 12th March 1896.	16	450	13½	317 seed cotton.	.....
38	Do. (Eru) ...	659 Pot No. 1	3 27 2 8	14 8 0 8 10 0	Do. (Four pickings), 3rd February to 13th March 1896	16	450	8	430 seed cotton.	.....

Surat District, 1895-96—continued.

are of the Original Survey.

ACRE.			Area of Test.	Equivalent in Tolas of local weight Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
Total Value of Produce.	Assessment excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.			Principal Product.	By-Product.	
12	13	14	15	16	17	18	19
Rs. a. p.	Rs. a. p.	Per cent.	A. g.	Tolas.	Lbs.	Cwts.	
22 12 9	3 7 9	15.28	0 8	37½	42½ juvâr, 38½ taver, 38½ mag.	107 bundles kadbi.	
23 15 6	6 4 1	26.09	0 8	Do.	46	133 bundles kadbi.	Experiment No. 34.—Subordinate crops, <i>taver</i> and <i>mag</i> , not tested. Prices of grain taken by Mr. Wood rather low.
31 10 9	5 4 2	16.60	0 8	Do.	46	133 bundles kadbi.	Experiment No. 35.—Subordinate crops, <i>taver</i> and <i>mag</i> , not tested.
15 0 3	3 2 10	19.83	0 8	Do.	46 juvâr, 33 taver, 33 mag.	133 bundles kadbi; 4½ chaff; 200 bundles taver stalks; 1½ taver husks; 1 mag husk.	
27 8 0	5 13 9	21.30	0 8	Do.	11 7 13	...	Experiment No. 37.—Formulae yield (450 lbs.) too high.
37 4 8	3 14 9	10.49	0 8	Do.	11 7 13	...	

Summary of Crop Experiment Reports,

Figures in columns 5 and 13

No.	Taluka, Village and Experimenter.	Survey Number or Pot Number.	Net area exclud- ing Pot Kharab.	Assessment of the Field.	Crop and Date of Experiment.	Local Esti- mate in Annas.	Yield accord- ing to Formu- lae.	AVERAGE PER		
								Seed.	Yield of	
									Principal Product.	By-Product.
1	2	3	4	5	6	7	8	9	10	11
	<i>Mr. C. N. Seddon, Assistant Collector — continued.</i>		A. g.	Rs. a. p.		Annas.	Lbs.	Lbs.	Lbs.	Lbs.
39	Jalálpor (Jalálpor) ...	498	3 14	22 6 0 (4 6 0 water-rate).	Cotton (Three pickings), 29th January to 27th February 1896.	16	450	12	341 seed cot- ton.	.....
40	Do. (do.) ...	499	5 8	25 0 0	Do. ...	16	450	12	481 seed cot- ton.	.....
41	Do. (do.) ...	47 Bágáyat	1 5 0 37	19 8 0 18 4 0	Rice (Jádu Sálin), 27th October 1895; followed by	12	1,690	104	3,349 in husk.	3,296 bundles.
42	Do. (do.) ...	Do. ...	Do.	Do. ..	Dolichos lablab (Vál) and Castor-seed, 13th March 1896.	16	675	54 5½	1,685 27 seed.	1,154
43	Do. (Hansápor) .	31 Pot No. 3	2 24 0 25	30 0 0 7 4 0 (1 15 3 water-rate).	Rice (Kada), 27th October 1895; followed by	16	2,250	154	1,703 in husk.	2,280 bundles.
44	Do. (do.)...	Do. ...	Do.	Do. ...	Dolichos lablab (Vál) and Castor-seed, 12th March 1896.	12	510	57 8	335 21 seed.	385
45	Do. (Vijalpor) ...	115 Pot No. 4	2 26 0 37	49 7 0 16 8 0 (5 5 1 water-rate).	Rice (Kada), 23rd October 1895.	14	1,970	240	1,578 in husk.	2,520 bundles.
	<i>Mr. H. D. E. Forbes, Assist. Supt., Guj. Rev. Survey.</i>									
46	Do. (Saribujrag) .	307 Rice.	1 14 1 2	21 0 0 19 8 0 (7 8 9 water rate).	Rice (Kolamb), 11th November 1895.	16	2,250	108	2,548 in husk.	6,700
	<i>Mr. C. N. Seddon, Assistant Collector.</i>									
47	Do. (Jalálpor) ...	525	2 38	24 8 0	Sugarcane (Ván- si), 28th January 1896.	16	5,250	14,000 sets.	5,538 Gol.	8,000 tops.

Surat District, 1895-96—continued.

are of the Original Survey.

ACRE.			Area of Test,	Equivalent in Tolas of local weight Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
Total Value of Produce,	Assessment, excluding Local Funds,	Incidence of Assessment on the Value of Gross Produce,			Principal Product.	By-Product.	
12		14	15	16	17	18	19
Rs. a. p.	Rs. a. p.	Per cent.	A. g.	Tolas.	Lbs.	Cwts.	
29 9 4	6 10 10	22.57	0 8	37½	11 7/13	...	
41 10 8	4 12 11	11.54	0 8	Do.	Do.	...	Experiment No. 40.—Land lately broken up for cultivation.
84 6 9	19 11 8	23.37	0 5	Do.	44	400 bundles.	Experiment Nos. 41 and 42.—This was a wonderfully good field manured fairly, but not very heavily. Cultivator said he gets better crops sometimes. Incidence on the double crop comes to 16.11 per cent.
37 15 11	Do.	51.92	0 8	Do.	57½ vál, 21½ castor.	1½	
38 14 4	11 9 7	29.82	0 4	Do.	51½	400 bundles.	Experiment Nos. 43 and 44.—Vál outturn affected adversely by the shade of mango trees, whose produce is, however, valuable. Incidence on the double crop 23.76 per cent.
9 14 5	Do.	117.14	0 4	Do.	57½ vál, 21½ castor.	1 1/10	
37 1 2	17 13 5	48.11	0 4	Do.	51½	400 bundles	Experiment No. 45.—Sugarcane followed the rice. Only rice, therefore, was tested and the incidence is on the first crop alone. Field always grows a second crop of vál or is planted with sugarcane.
70 8 11	18 9 1	26.31	0 4	Do.	38½	13½	Experiment No. 46.—No second crop this year. Incidence, therefore, on the rice crop only. The field usually grows Kada rice followed by a second crop of vál.
272 8 0	8 4 11	3.04	0 1	Do.	20½	...	Experiment No. 47.—Malbári cane, which is superior, does not grow near the village of Jalálpor. By-products not valued.

Summary of Crop Experiment Reports,

Figures in columns 5 and 13

No.	Taluka, Village, and Experimenter.	Survey Number or Pot Num- ber.	Net area exclud- ing Pot Kharab.	Assessment of the Field.	Crop and Date of Experiment.	Local Esti- mate in Annas.	Yield accord- ing to Formu- lae.	AVERAGE PER		
								Seed.	Yield of	
									Principal Product.	By-Product.
1	2	3	4	5	6	7	8	9	10	11
			A. g.	Rs. a. p.		Annas.	Lbs.	Lbs.	Lbs.	Lbs.
48	Mr. T. R. Fernandez, Dy. Supt., Guj. Rev. Survey. Jalálpor (Munsád) ...	519 Pot No. 2	... 0 38	... 9 8 0 (0 8 0 water-rate).	Sugarcane (Mal- bári), 17th Nov- ember 1895.	16	5,250	2,600 canes.	8,049 Gol.	1,480 bundles dry leaves.
49	Do. (do.) ...	481	2 34	26 8 0 (1 8 0 water rate)	Do. (do.), 18th January 1896.	18	6,125	2,550 do.	8,972 do.	1,260 bundles dry leaves.
	Mr. B. Robertson, Assistant Collector.									
	Do. (Supa) ...	271	4 18	41 8 0	Do. (do.) 10th December 1886.	16	5,250	1,867 do.	5,325 do.	173 bundles green leaves and tops.
	Mr. E. A. L. Moore, Assistant Collector.									
	Do. (A't) ...	306	1 30	19 8 0 (including water- rate).	Do. (Vansi), 5th January 1888.	20	7,000	1,436 do.	7,666 do.	2,533 bundles dry canes. 533 bundles green tops. 8,000 bundles leaves.
	Mr. E. Maconochie, Assistant Collector.									
	Do. (Hansapor) ...	94 Kiari.	2 9 1 37	29 6 0 28 4 0 (10 12 7 water- rate).	Do. (do.) 3rd February 1891.	16	5,250	1,777 do.	5,230 do.	6,480 green tops.
	Mr. W. Doderet, Assistant Collector.									
	Do. (Munsád) ...	523	3 22	55 10 0 (17 13 9 water rate).	Do. (Malbári and Vansi mix- ed), 14th Decem- ber 1893.	17	5,690	21,600 sets.	5,712 do.	1,400 bundles dry leaves.
	Mr. P. R. Cadell, Assistant Collector.									
	Do. (A't) ...	423 Pot No. 2	0 34 0 24	9 4 0 8 2 0	Do. (Vansi), 27th January 1895.	16	5,250	2,084 canes.	4,945 do.	5,010 bundles leaves.

Surat District, 1895-96—continued.

are of the Original Survey.

ACRE.			Area of Test.	Equivalent in Tolas of local weight Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
Total Value of Produce.	Assessment excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.			Principal Product.	By-Product.	
12	13	14	15	16	17	18	19
Rs. a. p.	Rs. a. p.	Per cent.	A. g.	Tolas.	Lbs.	Cwts.	
464 4 9	10 0 0	2.15	0 1	36	17 $\frac{3}{4}$	100 bundles.	Experiment No. 48.—Heavily manured sugarcane on a rice field growing this crop once in six years.
494 11 7	9 4 9	1.83	0 2	36	18 $\frac{3}{5}$	100 do.	Experiment No. 49.—Sugarcane grown for the first time.
250 0 0	9 5 3	3.73	0 3	37	22	16 do.	For remarks, &c., vide Experiment No. 12 of Report for 1886-87.
505 4 5	11 2 3	2.20	0 3	37 $\frac{1}{2}$	19	83 bundles dry canes; 20 green tops; 200 dry leaves.	Do. No. 16 of Report for 1887-88.
311 10 6	14 10 9	4.52	0 4	Do.	18	2 $\frac{1}{7}$	Do. No. 24 of Report for 1890-91.
268 4 0	15 10 8	5.83	0 4	Do.	22 $\frac{1}{2}$	100 bundles.	Do. No. 33 of Report for 1893-94.
265 2 3	13 8 8	5.10	0 4	Do.	20 $\frac{3}{5}$	200 do.	Do. No. 23 of Report for 1894-95.

Summary of Crop Experiment Reports,

Figures in columns 5 and 13

No.	Táluka, Village, and Experimenter.	Survey Number or Pot Num- ber.	Net area exclud- ing Pot Kharáb.	Assessment of the Field.	Crop and Date of Experiment.	Local Esti- mate in Annas.	Yield accord- ing to Formu- læ.	AVERAGE PER		
								Seed.	Yield of	
									Principal Product.	By-Product.
1	3	3	4	5	6	7	8	9	10	11
			A. g.	Rs. a. p.		Annas.	Lbs.	Lbs.	Lbs.	Lbs.
50	Mr. O. N. Seddon, Assistant Collector. Jalápor (Jalálpor) ...	521	4 21	53 0 0 (28 0 0 water rate).	Groundnut, 3rd February 1896.	14	2,620	25 to 30	1,846 fresh nuts.	Not weighed.
	Mr. J. W. A. Weir, Assistant Collector. Do. (Eru) ...	491	7 8	25 8 0	Castor-seed, 28th March 1893.	11	360	14	415	.....
51	Mr. O. N. Seddon, Assistant Collector. Chorási (Magob) ...	31	8 34	45 0 0	Sorghum vulgare (Pirio Juvár), Cajanus indicus (Tuver), 19th December 1895.	16	1,200	8 3½	1,149 46	410 bundles Kadbi; 35 light Juvár grain; 65 chaff; 210 J u v á r heads. 335 bundles Kadbi; 45 light Juvár grain; 45 chaff; 200 J u v á r heads. 295 bundles Kadbi; 57 chaff and light Juvár grain; 85 J u v á r heads.
52	Do. (do.) ...	30	14 6	69 0 0	Sorghum vulgare (Pirio Juvár), Cajanus indicus (Tuver), 19th December 1895.	14	1,050	8 c 3½	1,092 18	
53	Do. (Althán) ...	21	9 17	47 8 0	Sorghum vulgare (Pirio Juvár), Cajanus indicus (Tuver), 20th December 1895.	12 to 13	900 or 975	6 3	754 14	

Surat District, 1895-96—continued.

are of the Original Survey.

ACRE.			Area of Test.	Equivalent in Tolas of local weight Ser	PRICES OF PRODUCE PER RUPEE.		REMARKS.
Total Value of Produce.	Assessment excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.			Principal Product.	By-Product.	
12	13	14	15	16	17	18	19
Rs. a. p.	Rs. a. p.	Per cent.	A. g.	Tolas.	Lbs.	Cwt.	
58 8 0	11 11 5	20.02	0 1	37½	33	...	<i>Experiment No. 50.—One crop of sugarcane and one of groundnut taken off the ground every three years. No manure applied to the groundnut.</i>
20 5 0	3 8 8	17.43	0 8	37	20½	...	<i>For details vide Experiment No. 43 of Report for 1892-93.</i>
38 2 5	5 1 4	13.32	0 8	37½	42 juvār; 33½ tuver.	53½ bundles.	<i>Experiment No. 51.—The soil of Magob and Kumbharia is the best soil in the Chorasi taluka, except possibly bhata soil.</i>
34 12 5	4 14 0	14.02	0 8	Do.	42 juvār; 33½ tuver.	53½ Do.	<i>Experiment No. 52.— Do. do.</i>
24 13 10	5 0 8	20.29	0 8	Do.	42 juvār; 33½ tuver.	53½ Do.	<i>Experiment No. 53.—Land somewhat salty. Yield slightly affected by short rainfall.</i>

Summary of Crop Experiment Reports,

Figures in columns 5 and 13

No.	Taluka, Village, and Experimenter.	Survey Number or Po-ber.	Net area exclud- ing Pot Kharab.	Assessment of the Field.	Crop and Date of Experiment.	Local Esti- mate in Annas.	Yield accord- ing to Formu- la.	AVERAGE PER		
								Seed.	Yield of	
									Principal Product.	By-Product.
1	2	3	4	5	6	7	8	9	10	11
			A. g.	Rs. a. p.		Annas.	Lbs.	Lbs.	Lbs.	Lbs.
	<i>Mr. C. N. Seddon, Assistant Collector —continued.</i>									
54	Chorási (Althán) ...	26	5 8	32 8 0	Sorghum vulgare (Pirio Juvár), 1st January 1896.	16	1,200	6 $\frac{2}{3}$	1,136	310 bundles Kadbi; 77 chaff; 115 heads.
55	Do. (do.) ...	24	3 23	20 8 0	Do. (do.) 2nd January 1896.	17	1,800	6 $\frac{2}{3}$	670	190 bundles Kadbi; 45 chaff; 75 heads.
	<i>Mr. J. Mollison, Superintendent of Farms.</i>									
56	Do. (Althán) ...	19	5 11	32 0 0	Do. (Sholápur Juvár), Cajanus indicus (Tuver), 5th December 1895.	18	1,400	6 $\frac{2}{3}$	1,063	277 bundles Kadbi.
57	Do. (do.) ...	49	8 6	49 8 0	Do. (Deshi Juvár), Cajanus indicus (Tuver), 27th December 1895.	20	1,600	6 $\frac{2}{3}$	1,070	285 bundles Kadbi.
58	Do. (Magob) ...	46	2 15	16 8 0	Cotton (Three pickings), 22nd January to 21st February 1896.	16	450	17	402- seed- cotton.	.....
59	Do. (Althán) ...	44	15 2	88 8 0	Do. (Three pickings), 24th January to 23rd February 1896.	20	600	12	394 Do.	.....
60	Do. (do.) ...	42	2 25	15 0 0	Do. (Three pickings), 25th January to 23rd February 1896.	20	600	12	387 Do.	.....

Surat District, 1895-96—continued.

are of the Original Survey.

ACRE.			Area of Test.	Equivalent in Tolas of local weight Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
Total Value of Produce.	Assessment excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.			Principal Product.	By-Product.	
12	13	14	15	16	17	18	19
Rs. a. p.	Rs. a. p.	Per cent.	A. g.	Tolas.	Lbs.	Cwt.	
33 13 3	6 4 0	18.47	0 8	37½	42	53½ bundles.	Experiment No. 54.—Minor pulses also sown but their yield quite negligible; practically they failed.
20 2 6	5 11 9	28.45	0 8	Do.	42	53½ Do.	Experiment No. 55.— Do. do.
30 3 8	6 1 1	20.06	0 8.37	Do.	42½ juvār; 32½ tuver,	67 Do.	Experiment No. 56.—Minor by-products neglected by experimenter as a set off against non-cultivation of headland.
31 4 5	6 1 2	19.41	0 8	Do.	41 juvār; 32½ tuver.	67 Do.	Experiment No. 57.—A very carefully tilled field.
34 13 9	6 15 2	19.93	0 8.9	Do.	11½ 13	...	
34 1 11	5 14 1	17.23	0 9.45	Do.	11½ 13	...	Experiment No. 59.—Anna valuation too high; 16 or 17 annas nearer the mark.
33 8 11	5 11 5	17.02	0 7.8	Do.	11½ 13	...	Experiment No. 60.—Field carefully cultivated though no manure applied.

Summary of Crop Experiment Reports,

Figures in columns 5 and 13

No.	Taluka, Village and Experimenter.	Survey Number or Pot Number.	Net area excluding Pot Kharāb.	Assessment of the Field.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formula.	AVERAGE PER		
								Seed.	Yield of	
									Principal Product.	By-Product.
1	2	3	4	5	6	7	8	9	10	11
	<i>Mr. J. Mollison, Superintendent of Farms—contd.</i>		A. g.	Rs. a. p.		Annas.	Lbs.	Lbs.	Lbs.	Lbs.
61	Chorási (Bhatár) ...	119	2 36	16 8 0	Cotton (Three pickings), 26th January to 23rd February 1896.	18	525	12	348 seed-cotton.	.....
	<i>Mr. C. N. Seddon, Assistant Collector.</i>									
62	Do. (Althán) ...	46	4 35	28 8 0	Sesamum (Tal), 15th January 1896.	12	450	1	202 seed.	.....
63	Do. (do.) ...	34	7 3	60 0 0 (24 6 0 water-rate)	Do. (do.) 17th January 1896.	16	600	1	372 Do.	.....
	<i>Mr. P. E. Mehta, Sub-Assistant Supt., Guj. Rev. Survey.</i>									
64	Do. (Kacholi) ...	7 Pot No.	1 34 0 28	20 0 0 7 10 0 (1 12 0 water-rate)	Rice (Kada), 12th October 1895.	10	1,125	137	1,831 in husk.	1,440
65	Do. (Párdi Rákeb.)	5 Pot No.	4 31 4 10	23 8 0 20 14 0	Do. ...	10	1,125	150	1,533 Do.	1,320
66	Do. (Sámrod) ..	43	3 13	13 2 0	Do. ...	12	1,350	119	1,874 Do.	1,480
67	Do. (Kaphleta) ...	131 Pot No.	1 15 0 14	11 8 0 3 0 0	Do. ...	10	1,125	81	1,762 Do.	1,620
68	Do. (Talangpor)...	148 Pot No.	0 26 0 6	8 10 0 1 12 0 (0 8 0 water-rate).	Do. ...	14	1,575	128	2,975 Do.	2,720
69	Do. (Páli) ..	41 Pot No.	2 18 0 2	24 8 0 0 10 0 (0 2 2 water-rate)	Do. ..	12	1,350	70	2,115 Do.	2,800
	<i>Mr. D. N. Nánávati, District Deputy Collector.</i>									
	Do. (Kaphleta) ...	231 Rice.	1 8 1 1	20 4 0 19 8 0 (8 14 0 water-rate).	Dolichos lablab (Vál), 14th March 1891.	16	675	76	1,732	2,070 chaff ; 1,605 stalks.

Surat District, 1895-96—continued.

are of the Original Survey.

ACRE.			Area of Test.	Equivalent in Tolas of local weight Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
Total Value of Produce.	Assessment, excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.			Principal Product.	By-Product.	
12	13	14	15	16	17	18	19
Rs. a. p.	Rs. a. p.	Per cent.	A. g.	Tolas.	Lbs.	Cwts.	
30 2 3	5 11 0	18.87	0 6.9	37½	117 13	...	Experiment No. 61.—Crop 12 annas according to formulæ. Anna valuation high.
14 0 7	5 13 6	41.63	0 8	Do.	14½	...	Experiment No. 62.—A commoner crop in Olpád. Its cultivation may spread as it is a good preparation for cotton.
25 13 3	8 7 8	32.82	0 8	Do.	14½	...	
41 1 0	10 14 3	26.52	0 1	Do.	47½	5½	Experiment No. 64.—No second crop this year. Incidence on the first crop only. The field has grown a second crop 6 times out of the last 9 years.
34 9 0	4 14 7	14.21	0 1	Do.	Do.	Do.	Experiment No. 65.—New rice land. No second crop this year. Incidence on the rice alone. The field has grown a second crop 6 times out of the last 7 years.
42 1 3	3 15 2	9.37	0 1	Do.	Do.	Do.	Experiment No. 66.—Converted into rice land in 1891. No second crop this year. Incidence on the rice alone. The field has only once grown a second crop since it was converted.
39 15 0	8 9 2	21.46	0 1	Do.	Do.	Do.	Experiment No. 67.—No second crop. Incidence on the rice only. Has grown a second crop of <i>vál</i> 4 times during the last 9 years.
67 5 10	11 10 8	17.31	0 1	Do.	Do.	Do.	Experiment No. 68.—Has had a second crop of <i>vál</i> this year but it was found impossible to get to the field to test the <i>vál</i> . Incidence therefore on rice alone.
49 5 8	12 8 0	25.32	0 2	Do.	Do.	Do.	Experiment No. 69.—Only rice tested. The field has grown a second crop of <i>vál</i> 7 times out of the last 9 years. Incidence on the first crop only.
50 13 9	19 0 4	37.39	0 4	Do.	57	1 chaff; 5½ stalks.	Second crop after rice. Incidence on it alone. For other remarks, vide Experiment No. 25 of Report for 1890-91.

Summary of Crop Experiment Reports,

Figures in columns 5 and 13

No.	Taluka, Village and Experimenter.	Survey Number or Pot Number.	Net area excluding Pot Kharab.	Assessment of the Field.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formula.	AVERAGE PER		
								Seed.	Yield of	
									Principal Product.	By-Product.
1	2	3	4	5	6	7	8	9	10	11
			A. g	Rs. a. p.		Annas	Lbs.	Lbs.	Lbs.	Lbs.
	<i>Mr. C. N. Seddon, Assistant Collector.</i>									
70	Chorási (Kumbhária.)	183	2 22	43 0 0 (18 0 0 water-rate)	Sugarcane (Surti Meva), 4th January 1896.	12	..	9,360 sets.	37,600 canes.	.....
71	Do. (Magob) ...	27	9 10	118 8 0 (66 0 0 water-rate).	Do. 7th November 1895.	16	...	7,200 do.	47,360 do.	.....
72	Do. (Adájan) ...	14 Pot No. 2	2 12 0 25	43 0 0 11 10 0	Do. 6th December 1895.	12	...	9,000 do.	39,320 do.	.....
73	Do. (do.) ...	47 Pot No. 2	1 8 0 25	22 8 0 11 12 0	Do. ...	14	...	9,000 do.	32,640 do.	.....
	<i>Mr. J. Mollison, Superintendent of Farms.</i>									
74	Do. (Adájan) ...	27	1 6	20 8 0	Do. 13th December 1895.	16	...	9,600 do.	26,188 canes, 7,550 pieces (number)	.....
	<i>Mr. O. N. Seddon, Assistant Collector.</i>									
75	Do. (Kumbhária) .	285	2 35	37 0 0 (14 13 0 water-rate).	Groundnut, 10th December 1895.	10	1,875	120	1,206 in shell.	4,800
	<i>Mr. J. Mollison, Superintendent of Farms.</i>									
76	Do. (do.) ...	229	2 37	15 8 0	Do. 14th February 1896.	14	2,650	75	1,620 in shell.	Not weighed.
	<i>Mr. O. N. Seddon, Assistant Collector.</i>									
77	Do. (Magob) ...	69 Pot No. 2	...	...	Cabbages, 11th December 1895.	13	...	1 1/4	10,107 (number of cabbages)	.....
	<i>Mr. J. Mollison, Superintendent of Farms.</i>									
78	Do. (do.) ...	27	9 10	118 8 0 (66 0 0 water-rate).	Do. 22nd February 1896.	16	...	2	11,596 do.	.....

Surat District, 1895-96—continued.

are of the Original Survey.

ACRE.			Area of Test.	Equivalent in Tolas of local weight Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
Total Value of Produce.	Assessment, excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.			Principal Product.	By-Product.	
12	13	14	15	16	17	18	19
Rs. a. p.	Rs. a. p.	Per cent.	A. g.	Tolas.	Lbs.	Cwt.	
200 0 0	16 13 10	8.43	0 1	...	188 canes.	...	<i>Experiment No. 70.</i> —All sugarcane tested in the Chorási taluka are eating canes. Formulæ do not give the yield for this cane. In column 17 only the average value is shown; for details see remarks in the analysis.
296 0 0	12 13 0	4.32	0 1	...	160 do.	...	<i>Experiment No. 71.</i> — Do. do.
191 1 7	18 9 7	9.73	0 1	...	206 do.	...	<i>Experiment No. 72.</i> —Sugarcane on bhāta land.
227 8 0	18 12 10	8.26	0 1	...	144 do.	...	<i>Experiment No. 73.</i> —Land similar to above. Crop damaged a little by rats and jackals and affected a little by blight.
286 4 7	17 13 3	6.23	0 0.53	...	130 canes, 274 pieces.	...	<i>Experiment No. 74.</i> —Land as above. Sugarcane grown once in five years.
55 2 7	12 13 11	23.32	0 1	37½	25½	5½	<i>Experiment No. 75.</i> —Outturn very poor; reason unknown.
75 11 4	5 4 9	6.99	0 4.53	Do.	22	...	<i>Experiment No. 76.</i> —Outturn very poor.
829 4 3	12 2 11	1.47	0 2.05	...	12 cabbages	...	<i>Experiment No. 77.</i> —High prices obtained in the Bombay market owing to earliness of the crop. See detailed notes in the analysis.
362 6 0	12 13 0	3.53	0 0.89	...	32 do.	...	<i>Experiment No. 78.</i> —Price obtained in the Surat market for later crop.

Summary of Crop Experiment Reports,

Figures in columns 5 and 13

No.	Táluka, Village and Experimenter.	Survey Number or Pot Number.	Net area excluding Pot Kharáb.	Assessment of the Field.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formula.	AVERAGE PER		
								Seed.	Yield of	
									Principal Product.	By-Product.
1	2	3	4	5	6	7	8	9	10	11
	<i>Mr. J. Mollison, Superintendent of Farms—continued.</i>		A. g.	Rs. a. p.		Annas.	Lbs.	Lbs.	Lbs.	Lbs.
79	Chorási (Magob) ...	49	3 2	27 0 0 (12 0 0 water-rate).	Yams (Bhusra Ratálu), 9th December 1895.	10	2,810	5,440 sets.	8,061	.....
80	Do. (do.) ...	35	5 35	77 8 0 (44 0 0 water-rate).	Turmeric (Haldar), Yams (Talabda Ratálu), 21st January 1896.	16	3,000	2,340	13,570	.....
81	Do. (do.) ...	27	9 10	118 8 0 (66 0 0 water-rate.)	Turmeric (Haldar), Yams (Talabda Ratálu), 22nd February 1896.	16	3,000	2,140	14,842	.....
82	Do. (Kumbhária).	115 118	0 30 0 18	59 8 0 (40 15 0 water-rate.)	Onions (White), 15th February 1896.	14	9,200	1,000 small bulbs.	11,836	.....
83	Do. (do.) ...	285	2 35	37 0 0 (14 13 0 water-rate.)	Sweet potatoes (Sakaria), 24th February 1896.	14	7,220	...	8,509	.....
	Do. (do.) ...	216	1 24	28 0 0 (13 8 0 water-rate.)	Potatoes, 23rd February 1894.	15	9,140	788	7,513	.....
84	Olpád (Safetabad) ...	10	6 8	31 6 0	Sorghum vulgare (Juvár), 29th December 1895.	20	1,600	6 $\frac{2}{3}$	575	200 bundles.
85	Do. (Másma) ...	73	5 16	30 0 0	Sorghum vulgare (Juvár), Cajanus indicus (Tuver), 29th December 1895.	20	1,600	6 $\frac{2}{3}$ 5	781 42	353 do.
86	Do. (Saroli) ...	93	5 9	32 8 0	Sorghum vulgare (Juvár), 30th December 1895.	20	1,600	6 $\frac{2}{3}$	735	310 do.

Surat District, 1895-96—continued.

are of the Original Survey.

ACRE.			Area of Test.	Equivalent in Tolas of local weight Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
Total Value of Produce.	Assessment, excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.			Principal Product.	By-Product.	
12	13	14	15	16	17	18	19
Rs. a. p.	Rs. a. p.	Per cent.	A. g.	Tolas.	Lbs.	Cwt.	
104 12 8	8 13 8	8.45	0 4.25	37½	77	...	Experiment No. 79.—Formulae yield certainly wrong.
213 7 9	13 3 1	6.17	0 4	Do.	109½ turmeric, 66½ yams.	...	Experiment No. 80.—Outturn in column 10 represents weight of uncleaned product. The cleaned product is $\frac{11}{16}$ of the uncleaned article.
269 13 2	12 13 0	4.74	0 4.18	Do.	109½ turmeric 66½ yam.	...	Experiment No. 81.—Outturn in column 10 represents weight of unclean product. The clean product is $\frac{11}{16}$ of the uncleaned article. Tillage very good.
173 1 7	27 0 9	15.62	0 2.2	Do.	68½	...	Experiment No. 82.—The field tested was Survey No. 115. As both the Survey Nos. (115 and 118) given, pay a lump sum together for the well both have been shown in columns 4-6 and average assessment per acre in column 13 based thereon.
203 6 10	12 13 11	6.32	0 2.125	Do.	41½	...	Experiment No. 83.—Outturn much higher than in Bārdoli experiments.
141 6 3	17 8 0	12.37	0 4.117	Do.	53½	...	Outturn high. For remarks vide Experiment No. 37 of Report for 1893-94.
16 8 5	5 0 11	30.60	0 8	Do.	41	80 bundles.	Experiment No. 84.—Anna estimate perhaps too high. Subordinate pulses not tested.
23 13 11	5 8 11	23.27	0 8.5	Do.	41 juvār, 32½ tuver.	100 do.	Experiment No. 85.—Anna estimate high.
21 13 1	6 3 6	28.50	0 8	Do.	41	80 do.	Experiment No. 86.—Subordinate crops, untested but as the juvār was good, probably insignificant.

Summary of Crop Experiment Reports,

Figures in columns 5 and 13

No.	Taluka, Village and Experimenter.	Survey Number or Pot Num- ber.	Net area exclud- ing Pot Kharab.	Assessment of the Field.	Crop and Date of Experiment.	Local Esti- mate in Annas.	Yield accord- ing to Formu- lae.	AVERAGE PER		
								Seed.	Yield of	
									Principal Product.	By-Product.
1	2	3	4	5	6	7	8	9	10	11
			A. g.	Rs. a. p		Annas.	Lbs.	Lbs.	Lbs.	Lbs.
87	Mr. J. Modliscn, Superintendent of Farms—continued. Olpád (Saroli) ...	64	10 34	58 8 0	Sorghum vulgare (Juvár) and Cajanus indicus (Taver), 30th December 1895.	20	1,600	6 $\frac{2}{3}$	888	256 bundles.
88	Do. (Ambheta) ...	324	11 15	54 0 0	Sorghum vulgare (Juvár), 1st Ja- nuary 1896.	16	1,200	6 $\frac{2}{3}$	313	do. 169
89	Do. (do.) ...	280	6 36	40 0 0	Do. 1st Ja- nuary 1896.	20	1,600	11 $\frac{2}{3}$	1,005	do. 255
	Mr. Umedráam Ranchod- dás, District Deputy Collector.									
	Do. (Sandhiar) ...	206	6 35	44 0 0	Do. 11th Ja- nuary 1888.	16	1,200	8 $\frac{1}{2}$	677	1,564
	Do. (Takárma) ...	150	4 7	25 0 0	Do. 16th January 1888.	16	1,200	6 $\frac{5}{7}$	741	1,680
	Do. (Saras) ...	325	7 32	42 8 0	Do. 15th January 1889.	16	1,200	8	781	3,275
	Do. (do.) ...	289	12 0	60 0 0	Do. 16th January 1889.	16	1,200	8	484	2,245
	Mr. J. Mollison, Superintendent of Farms.									
90	Olpád (Másmá) ...	78	1 30	9 6 0	Cotton (Three pickings), 23rd January to 25th February 1896.	18	525	16 $\frac{2}{3}$	362 seed cotton.	.....
91	Do. (do.) ...	160	2 8	13 0 0	Do. (Three pickings), 23rd January to 26th February 1896.	10 to 12	280 335	16 $\frac{2}{3}$	268 do.	.....
92	Do. (Saroli) ...	107	2 1	12 4 0	Do. (Three pickings), 27th January to 23rd February 1896.	20	600	16 $\frac{2}{3}$	575 do.	.....
93	Do. (do.) ...	75	5 6	36 8 0	Cotton (Three pickings), 27th January to 23rd February 1896.	16	450	16 $\frac{2}{3}$	352 seed cotton.	.....
94	Do. (Ambheta) ...	225	4 27	24 0 0	Do. (Three pickings), 28th January to 26th February 1896.	18	525	16 $\frac{2}{3}$	327 do.	.....

Surat District, 1895-96—continued.

are of the Original Survey.

ACRE.			Area of Test.	Equivalent in Tolas of local weight Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
Total Value of Produce.	Assessment excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.			Principal Product.	By-Product.	
12	13	14	15	16	17	18	19
Rs. a. p.	Rs. a. p.	Per cent.	A. g.	Tolas.	Lbs.	Cwts.	
26 3 9	5 6 3	20.54	0 5	37½	41 juvār, 32½ tuver.	67 bundles.	Experiment No. 87.—Outturn better than in any of the last three. Still auna-valuation too high.
9 12 0	4 11 11	48.66	0 8.3	Do.	41	80 do.	Experiment Nos. 88 and 89.—The village is divided into a good and, chiefly owing to water-logging, a bad half. The first experiment was taken in the bad and the second in the good. Subordinate pulses not tested.
27 11 2	5 12 9	20.92	0 8	Do.	41	80 do.	
26 1 9	6 6 5	24.51	0 9	37	34	2¼	Subordinate pulses not tested. For detailed remarks vide Experiment No. 19 of Report for 1887-88.
27 7 7	5 15 9	21.78	0 9	Do.	35	2¼	Do. do. Experiment No. 20 of Report for 1887-88.
27 13 10	5 7 2	19.55	0 8	37	38	4	Do. do. Experiment No. 71 of Report for 1888-89.
17 11 9	5 0 0	28.19	0 8	37½	38	4	Do. do. No. 12 of Report for 1888-89.
31 6 0	5 5 9	17.08	0 11.6	Do.	11⅞ ₁₃	...	Experiment No. 90.—Fair average crop for good villages in the south-east of the taluka.
23 3 7	5 14 7	25.45	0 13	Do.	11⅞ ₁₃	...	Experiment No. 91.—Crop under average for the village.
49 13 4	6 0 9	12.13	0 8	Do.	11⅞ ₁₃	...	Experiment No. 92.—Specially selected as a first class crop. The land has been grass land till lately.
30 8 1	7 1 5	23.23	0 7.9	Do.	11⅞ ₁₃	...	Experiment No. 93.—An average crop like that in Experiment No. 90.
23 5 8	5 2 2	18.11	0 11.3	Do.	11⅞ ₁₃	...	Experiment No. 94.—Anna estimate very high.

Summary of Crop Experiment Reports,

Figures in columns 5 and 13

No.	Táluka, Village and Experimenter.	Survey Number or Pot Num- ber.	Net area exclud- ing Pot Kharáb.	Assessment of the Field.	Crop and Date of Experiment.	Local Esti- mate in Annas.	Yield accord- ing to Formu- lae.	AVERAGE PER		
								Seed.	Yield of	
									Principal Product.	By-Product.
1	2	3	4	5	6	7	8	9	10	11
			A. g.	Rs. a. p.		Annas.	Lbs.	Lbs.	Lbs.	Lbs.
	<i>Mr. A. G. Kotváč,</i> <i>District Deputy</i> <i>Collector.</i>									
	<i>Olpačd (Barbodhan) ...</i>	285	1 24	18 8 0	<i>Rice (Mánjarvel),</i> <i>19th November</i> <i>1892.</i>	16	1,350	112	2,267 <i>in husk.</i>	2,609
	<i>Do. (Okha) ...</i>	31	5 23	46 8 0	<i>Do. (Sálku), 15th</i> <i>October 1893.</i>	20	1,800	76	2,392 <i>do.</i>	3,100
	<i>Do. (Bhesán) ...</i>	127 <i>Pot No.</i> <i>6</i>	...	...	<i>Do. (Kada), 21st</i> <i>October 1893.</i>	20	1,800	68	3,586 <i>do.</i>	4,850
	<i>Do. (Sáyan) ...</i>	379	3 4	36 8 0	<i>Do. (Mánjarvel),</i> <i>13th November</i> <i>1893.</i>	20	1,800	67	3,144 <i>do.</i>	6,190
	<i>Mr. Umedráč</i> <i>Ranchodás, District</i> <i>Deputy Collector.</i>									
	<i>Do. (Segwa) ...</i>	28	12 3	61 8 0	<i>Wheat, 19th Feb-</i> <i>ruary 1890.</i>	8	525	12 to 17	573	600
	<i>Mr. P. R. Mehta,</i> <i>Sub-Asst. Supt., Guj.</i> <i>Rev. Survey.</i>									
95	<i>Balasár (Málvan) ...</i>	444	0 24	0 13 0	<i>Grass, 17th</i> <i>November 1895.</i>	16	...	...	1,024 <i>bundles.</i>	.....
96	<i>Do. (Vásan) ...</i>	155	10 23	14 0 0	<i>Do. 18th Nov-</i> <i>ember 1895.</i>	16	...	...	1,352 <i>do.</i>	.....
97	<i>Do. (do.) ...</i>	176 <i>Pot No.</i> <i>1</i>	...	...	<i>Do. ...</i>	16	...	...	1,600 <i>do.</i>	.....
	<i>Mr. Pránál</i> <i>Harkisandás, District</i> <i>Deputy Collector.</i>									
98	<i>Do. (Gundláo) ...</i>	274	1 34	26 0 0 (9 11 5 <i>water-rate.)</i>	<i>Rice (Kada), 21st</i> <i>October 1895;</i> <i>followed by</i>	7	985	130	1,166 <i>in husk.</i>	1,452
99	<i>Do. (do.) ...</i>	<i>Do.</i>	<i>Do.</i>	<i>Do.</i>	<i>Dolichos lablab</i> <i>(Vál), 15th</i> <i>March 1896.</i>	13	580	50	753	540
100	<i>Do. (Nandávla) ...</i>	122	2 26	21 0 0	<i>Rice (Vánkvel),</i> <i>21st October</i> <i>1895;</i> <i>followed by</i>	12	1,690	141	1,974 <i>in husk.</i>	3,232
101	<i>Do. (do.) ...</i>	<i>Do.</i>	<i>Do.</i>	<i>Do.</i>	<i>Pisum sativum</i> <i>(Vatána, Peas).</i> <i>16th February</i> <i>1896.</i>	8	320	55	631	5

Surat District, 1895-96—continued.

are of the Original Survey.

ACRES.			Area of Test.	Equivalent in Tolas of local weight Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
Total Value of Produce.	Assessment excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.			Principal Product.	By-Product.	
12	13	14	15	16	17	18	19
Rs. a. p.	Rs. a. p.	Per cent.	A. g.	Tolas.	Lbs.	Cwts.	
46 6 6	11 9 0	24.91	0 4	37	51 $\frac{1}{2}$	6 $\frac{1}{6}$	Second crop may or may not be grown. Incidence only on the rice. For other remarks vide Experiment No. 47 of Report for 1892-93.
57 2 5	8 5 5	14.59	0 4	Do.	44 $\frac{4}{13}$	8 $\frac{6}{7}$	Do. do. vide Experiment No. 34 of Report for 1893-94.
79 1 8	14 8 6	18.37	0 4	Do.	48 $\frac{1}{2}$	8 $\frac{13}{14}$	Second crop occasionally taken. Incidence on rice alone, vide Experiment No. 35 of Report for 1893-94.
77 4 7	11 12 4	15.23	0 4	Do.	44 $\frac{4}{13}$	8 $\frac{6}{7}$	Second crop sometimes taken and sometimes not. Incidence on rice alone. Vide Experiment No. 36 of Report for 1893-94.
23 4 7	5 1 6	21.96	1 10	Do.	28	1 $\frac{3}{4}$	Dry-crop unmanured wheat. For detailed remarks vide Experiment No. 24 of Report for 1889-90.
7 2 8	1 5 8	18.89	0 10	...	143 bundles.	...	Experiment Nos. 95 to 97.—Bundles large in Nos. 95 and 96, but those in No. 97 smaller; hence valued cheaper.
9 7 5	1 4 11	13.82	0 10	...	143 do.	...	
8 0 0	1 3 6	15.23	0 10	...	200 do.	...	
27 11 2	14 0 10	52.73	0 10	37 $\frac{1}{2}$	45 $\frac{1}{2}$	6 $\frac{1}{2}$	Experiment Nos. 98 and 99.—Incidence on the two crops together comes to 32.00 per cent. But price of Kada rice given by Mr. Prānlāl far too high. Better, therefore, to take the value of the rice outturn at Rs. 25-8-0 when the incidence on double crop comes to about 34 per cent.
16 3 5	Do.	86.66	0 8	Do.	57 $\frac{1}{2}$	1 $\frac{4}{7}$	
50 8 8	7 14 10	15.69	0 10	Do.	43	6 $\frac{1}{4}$	Experiment Nos. 100 and 101.—Incidence on double crop 10.69 per cent. Rice valued too high. Valued at 47 $\frac{1}{2}$ lbs. per rupee, the value of total outturn comes to Rs. 69-13-0 and the incidence to 11.35 per cent.
23 9 11	Do.	33.56	0 8	Do.	32	1 $\frac{1}{2}$	

Summary of Crop Experiment Reports,
Figures in columns 5 and 13

No.	Táluka, Village and Experimenter.	Survey Number or Pot Num- ber.	Net area exclud- ing Pot Kharáb.	Assessment of the Field.	Crop and Date of Experiment.	Local Esti- mate in Annas.	Yield accord- ing to Formu- lae.	AVERAGE PER		
								Seed.	Yield of	
									Principal Product.	By-Product.
1	2	3	4	5	6	7	8	9	10	11
			A. g.	Rs. a. p.		Annas.	Lbs.	Lbs.	Lbs.	Lbs.
102	<i>Mr. F. X. D'Souza,</i> <i>Assistant Collector.</i> Balsár (Dhamdáchí)...	174	1 21	20 0 0 (6 0 1 water-rate.)	Rice (Vánkvel), 22nd October 1895 ; followed by	16	2,250	151	2,025 in husk.	3,120 bundles.
103	<i>Mr. P. R. Mehta,</i> <i>Sub-Asst. Supt., Guj.</i> <i>Rev. Survey.</i> Do. (do.)...	Do.	Do.	Do.	Dolichos lablab (Vál), 15th March 1896.	4	180	60	207	160 leaves, 135 stalks.
104	<i>Mr. F. X. D'Souza,</i> <i>Assistant Collector.</i> Do. (Chikhla) ...	305 Pot No. 5	... 0 17	... 6 6 0 (2 3 8 water-rate.)	Rice (Kada), 23rd October 1895 ; followed by	12	1,690	141	651 in husk.	2,580 bundles.
105	<i>Mr. P. R. Mehta,</i> <i>Sub-Asst. Supt., Guj.</i> <i>Rev. Survey.</i> Do. (do.) ...	Do.	Do.	Do.	Dolichos lablab (Vál), 15th March 1896.	5	225	40	286	105 leaves, 160 stalks.
106	<i>Mr. F. X. D'Souza,</i> <i>Assistant Collector.</i> Do. (Sarodhi) ...	225 Pot No. 1	... 0 18	... 8 0 0 (4 2 2 water-rate.)	Rice (Kada), 23rd October 1895 ; followed by	10	1,400	145	1,213 in husk.	1,700 bundles.
107	<i>Mr. P. R. Mehta,</i> <i>Sub-Asst. Supt., Guj.</i> <i>Rev. Survey.</i> Do. (do.) ...	Do.	Do.	Do.	Lathyrus sativus (Láng), 27th February 1896.	9	340	35	441	377 leaves, 103 stalks.
108	<i>Mr. F. X. D'Souza,</i> <i>Assistant Collector.</i> Do. (Párnera) ...	389 Pot No. 1	... 0 34	... 1 6 0	Rice (Kada), 21st October 1895 ; followed by	20	3,000	185	2,984 in husk.	1,620 bundles.
109	<i>Mr. P. R. Mehta,</i> <i>Sub-Asst. Supt., Guj.</i> <i>Rev. Survey.</i> Do. (do.) ...	Do.	Do.	Do.	Dolichos lablab (Vál), 27th Feb- ruary 1896.	8	360	40	388	344 leaves, 174 stalks.

Surat District, 1895-96—continued.
are of the Original Survey.

ACRE.			Area of Test.	Equivalent in Tolas of local weight Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
Total Value of Produce.	Assessment excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.			Principal Product.	By-Product.	
12	13	14	15	16	17	18	19
Rs. a. p.	Rs. a. p.	Per cent.	A. g.	Tolas.	Lbs.	Cwts.	
45 12 0	13 1 10	28.66	0 4	37½	47½	1,000 bundles.	Experiment Nos. 102 and 103.—For the valuation of straw in all Mr. D'Souza's rice experiments see analysis. Incidence on double crop comes to 25.91 per cent.
4 13 9	Do.	269.88	0 24	Do.	57½	1½ leaves, 5½ stalks.	
35 4 6	15 0 0	42.51	0 4	Do.	50½	1,000 bundles.	Experiment Nos. 104 and 105.—Incidence on the two crops 36.40 per cent.
5 14 9	Do.	253.29	0 8	Do.	57½	1½ leaves, 5½ stalks.	
25 11 11	17 12 5	69.05	0 4	Do.	50½	1,000 bundles.	Experiment Nos. 106 and 107.—Incidence on the double crop comes to 48.56 per cent.
10 13 11	Do.	163.53	0 7	Do.	50	1½½ leaves, 5½ stalks.	
60 11 2	1 9 10	2.66	0 4	Do.	50½	1,000 bundles.	Experiment Nos. 108 and 109.—New rice land. Anna estimate for first crop too high. Incidence on double crop 2.30 per cent.
9 4 11	Do.	17.34	0 8.5	Do.	57½	1½ leaves, 5½ stalks.	

Summary of Crop Experiment Reports,

Figures in columns 5 and 13

No.	Taluka, Village and Experimenter.	Survey Number or Pot Num- ber.	Net area exclud- ing Pot Kharáb.	Assessment of the Field.	Crop and Date of Experiment.	Local Esti- mate in Annas.	Yield accord- ing to Formu- læ.	AVERAGE PER		
								Seed.	Yield of	
									Principal Product.	By-Product.
1	2	3	4	5	6	7	8	9	10	11
			A. g.	Rs. a. p.		Annas.	Lbs.	Lbs.	Lbs.	Lbs.
10	Mr. F. X. D'Souza, Assistant Collector. Balsár (Ronvel) ...	20	1 33	17 8 0 (7 4 10 water-rate).	Rice (Vánkvel), 26th October 1895.	18	2,625	145	2,728 in husk.	2,630 bundles.
	Mr. W. Doderet, Assistant Collector. Do. (Balsár) ...	61	2 3	29 8 0	Do. (Kada), 15th October 1893.	15	2,110	229	2,094	2,531
	Do. (do.) ...	105	2 26	25 8 0	Do. (do.)...	18	2,625	181	2,698 in husk.	3,773
	Do. (do.) ...	546	3 31	87 0 0	Do. (do.)...	20	3,000	153	2,629 Do.	3,553
	Mr. E. H. E. Leggatt, Assistant Collector. Do. (Abrama) ...	31	0 30	10 13 3	Dolichos lablab (Val), 18th Ja- nuary 1893.	10	445	73½	1,046	2,950
11	Mr. F. X. D'Souza, Assistant Collector. Do. (Balsár) ...	22 and 23	0 32 0 16	13 10 0 7 0 0	Sugarcane (Mal- bári), 19th Nov- ember 1895.	16	4,875	1,860 canes.	7,420 gol.	1,260 bundles dry leaves.
12	Mr. P. R. Mehta, Sub-Asst. Supt., Guj. Rev. Survey. Do. (Kháparváda)...	463	0 11	5 8 0	Do. (do.), 15th November 1895.	16	4,875	1,800 Do.	8,830 Do.	2,420 Do.
	Mr. Syad Nuruddin Khán, Assistant Collector. Do. (Abrama) ...	336 Pot No. 4	5 16 1 7	65 8 0 14 4 0	Do. (Khajurdi), 6th December 1890.	14	4,260	1,800 Do.	8,584 Do.	22,760 tops and leaves.
	Do. (Párdi Harla) ...	5 Kíari.	6 19 5 6	66 14 0 64 0 0	Do. (Malbári), 11th December 1890.	13	3,960	1,800 Do.	8,718 Do.	14,456 Do.

Surat District, 1895-96—continued.

are of the Original Survey.

ACRE.			Area of Test.	Equivalent in Tolas of local weight Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
Total Value of Produce.	Assessment, excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce			Principal Product.	By-Product.	
12	13	14	15	16	17	18	19
Rs. a. p.	Rs. a. p.	Per cent.	A. g.	Tolas.	Lbs.	Cwt.	
60 0 11	9 9 5	15.96	0 4	37½	47½	1,000 bundles.	Experiment No. 110.—No second crop this year. Incidence on rice alone. Second crop almost always grown.
51 3 10	14 3 5	27.74	0 4	37½	43	9	Seed rates probably too high. Second crop (láng) was not tested. Incidence on the rice alone. Láng always grown. For other remarks vide Experiment No. 3 of Report for 1893-94.
63 1 3	9 9 11	15.25	0 4	Do.	45	10½	Incidence on rice only. Second crop grown when the land is moist. Vide Experiment No. 31 of Report for 1893-94.
57 14 4	23 0 9	39.80	0 4	Do.	48	10½	Incidence on rice only. Second crop of Val grown every year. Vide Experiment No. 32 of Report for 1893-94.
32 8 10	13 9 8	41.79	0 8	Do.	37	5	Second crop after rice. Incidence on it alone. Vide Experiment No. 44 of Report for 1892-93.
427 0 9	17 3 0	4.02	0 2	37½	18½	64 bundles.	Experiment No. 111.—Field enriched by fresh soil from a grove and plenty of manure.
493 1 10	20 0 0	4.05	0 2	37	19½	67 do.	Experiment No. 112.—Formulae evidently wrong.
550 4 8	12 1 11	2.20	0 5	Do.	16½	4½	Liberal manured field. For remarks, &c., vide Experiment No. 18 of Report for 1890-91.
591 6 0	12 6 9	2.10	0 5	.	15½	7½	No manure applied directly to the crop. Vide Experiment No. 19 of Report for 1890-91.

Summary of Crop Experiment Reports,

Figures in columns 5 and 13

No.	Taluka, Village and Experimenter.	Survey Number or Pot Number.	Net area excluding Pot Kharab	Assessment of the Field.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formula.	AVERAGE PER		
								Seed.	Yield of	
									Principal Product.	By-Product.
1	2	3	4	5	6	7	8	9	10	11
			A. g.	Rs. a. p.		Annas.	Lbs.	Lbs.	Lbs.	Lbs.
	<i>Mr. Darasha Dosabhai, District Deputy Collector.</i>									
	<i>Balsar (Vasior) ...</i>	89	11 12	21 0 0	<i>Castor-seed, 29th February 1892.</i>	10	280	41	427 seed.	.....
	<i>Mr. E. H. E. Leggatt, Assistant Collector.</i>									
	<i>Do. (Pardi Parnera)</i>	404	1 24	1 8 0	<i>Do. 19th March 1893.</i>	12	340	29	248 do.	.....
	<i>Do. (do.)</i>	387	1 9	1 5 0	<i>Do. 21st March 1893.</i>	10	280	31	180 do.	.....
	<i>Mr. Syad Nuruddin Khan, Assistant Collector.</i>									
	<i>Do. (Suroada) ...</i>	530	4 19	13 0 0	<i>Gram, 11th March 1890.</i>	8 to 10	320 to 400	37½	140	223
	<i>Do. (do.) ...</i>	530	4 19	13 0 0	<i>Pisum sativum (Vatana), Peas, 30th January 1891.</i>	12	480	41	588	768
	<i>Do. (do.) ...</i>	529	2 8	6 0 0	<i>Dolichos lablab (Kadva Val), 4th March 1891.</i>	10 to 12	450 to 530	58	370	811
	<i>Mr. Darasha Dosabhai, District Deputy Collector.</i>									
	<i>Do. (Abrama) ...</i>	183	8 2	11 8 0	<i>Paspalum scrobiculatum (Kodra), 7th December 1883.</i>	...	...	21	1,866	3,493
	<i>Mr. P. R. Mehta, Sub-Asst. Supt., Guj. Rev. Survey.</i>									
113	<i>Chikhli (Degam) ...</i>	912	6 26	14 8 0	<i>Sorghum vulgare (Juvár) and Cajanus indicus (Tuver), 17th December 1895.</i>	20	1,400	4 to 5 1 to 3	928 66	235 bundles Kadbi. 65 stalks.
114	<i>Do. (Bamanvel) ...</i>	113	8 11	12 0 0	<i>Sorghum vulgare (Juvár) and Cajanus indicus (Tuver), 18th December 1895.</i>	20	1,400	4 to 5 1 to 3	603 255	245 bundles Kadbi. 170 stalks.

Surat District, 1895-96—continued.

are of the Original Survey

ACRE.			Area of Test.	Equivalent in Tolas of local weight Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
Total Value of Produce.	Assessment excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.			Principal Product.	By-Product.	
12	13	14	15	16	17	18	19
Rs. a. p.	Rs. a. p.	Per cent.	A. g.	Tolas.	Lbs.	Cwt.	
19 11 0	1 13 8	9.41	0 8	37	21½	...	Dry-crop black soil growing castor every year without manure. For remarks, &c., vide Experiment No. 25 of Report for 1891-92.
11 6 6	0 15 0	8.21	0 8	Do.	22	...	A sole crop on ordinary black soil. Vide Experiment No. 45 of Report for 1892-93.
8 4 11	1 1 1	12.90	0 8	Do.	22	...	Do. do. No. 46 of Report for 1892-93.
4 6 7	2 14 5	65.78	0 6	Do.	32	...	Tank land submerged till November. Vide Experiment No. 23 of Report for 1889-90.
17 9 3	2 14 6	16.53	0 8	Do.	46½	1¾	Do. do. No. 20 of Report for 1890-91.
15 0 0	2 12 8	18.43	0 8	Do.	37	1½	Do. do. No. 21 of Report for 1890-91.
24 11 0	1 6 10	5.78	0 6	Do.	77	2¾	For remarks, &c., vide Experiment No. 19 of Report for 1883-84.
24 10 5	2 2 10	8.83	0 8	37½	43¼ juvār; 43¼ tuver.	200 bundles kadbi; 2½ tuver stalks.	Experiment No. 113.—The soil of this and the following three experiments by Mr. Mehta is better than the ordinary Chikhli dry-crop soil.
21 11 9	1 7 2	6.66	0 8	Do.	43¼ juvār; 43¼ tuver.	200 bundles kadbi; 2½ tuver stalks.	Experiment No. 114.—Field broken up for cultivation only since 1892-93.

Summary of Crop Experiment Reports,

Figures in columns 5 and 13

No.	Taluka, Village and Experiment.	Survey Number or Pot Number.	Net area excluding Pot Kharab.	Assessment of the Field.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formula.	AVERAGE PER		
								Seed.	Yield of	
									Principal Product.	By-Product.
1	2	3	4	5	6	7	8	9	10	11
			A. g.	Rs. a. p.		Annas.	Lbs.	Lbs.	Lbs.	Lbs.
115	Chikhli (Edhal) ...	335	2 0	5. 0 0	Sorghum vulgare (Juvár) and Cajanus indicus (Taver), 20th December 1895.	18	1,225	4 to 5	691	190 bundles Kadbi.
								1 to 3	213	130 stalks.
116	Do. (Minkachh)...	217	3 17	16 3 0 (5 10 0 water-rate).	Sorghum vulgare (Juvár) and Cajanus indicus (Taver), 25th December 1895.	18	1,225	4 to 5	757	280 bundles Kadbi.
								1 to 3	525	382 stalks.
	Mr. Umedram Ranchodas, District Deputy Collector.									
	Do. (Tankal) ...	471	6 30	15 0 0	Sorghum vulgare (Juvár) and Phaseolus mungo (Mag), 10th January 1884.	Good.	...	13½	623	.....
									41	
	Do. (Phadvel) ...	547	1 37 (recognised share).	2 2 0	Sorghum vulgare (Juvár), 17th December 1884.	16	1,050	11	1,456	200 bundles.
	Do. (do.) ...	844	6 17	6 0 0	Do. 18th December 1884.	16	1,050	11	1,235	210 do.
	Mr. F. X. D'Souza, Assistant Collector.									
117	Do. (Alipur) ...	474 Pot No. 3.	...	...	Rice (Kolamb), 10th November 1895.	18	2,360	128	2,852 in husk.	3,800 do.
			0 16	4 12 0 (1 9 7 water-rate).						
118	Do. (Ránkuva) ..	71	1 2	11 0 0 (3 15 0 water-rate).	Do. 11th November 1895;	14	1,770	89	2,015 do.	3,000 do.
	Mr. P. R. Mehta, Sub-Asst. Supt, Guj. Rev. Survey.									
119	Do. (do.) ...	Do.	Do.	Do. ...	Lathyrus sativus (Láng), 23rd February 1896.	3	110	30	176	65 leaves, 155 stalks.

Surat District, 1895-96—continued.

are of the Original Survey.

ACRE.			Area of Test.	Equivalent in Tolas of local weight Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
Total Value of Produce.	Assessment excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.			Principal Product.	By-Product.	
12	13	14	15	16	17	18	19
Rs. a. p.	Rs. a. p.	Per cent.	A. g.	Tolas.	Lbs.	Cwt.	
22 6 0	2 8 0	11.17	0 8	37½	43½ juvār; 43½ tuver.	200 bundles kadbi; 2½ tuver stalks.	Experiment No. 115.—Field slightly superior to the above. Same crops grown every year.
32 8 11	4 11 7	14.50	0 8	Do.	43½ juvār; 43½ tuver.	200 bundles kadbi; 2½ tuver stalks.	Experiment No. 116.—Field bears well assessment. Without water-rate assessment comes to Rs. 3-1-4 per acre and the incidence to 9.47 per cent.
16 0 4	2 3 7	13.88	0 6	37	48 juvār; 38½ mag.	5	For detailed remarks, &c., vide Experiment No. 17 of Report for 1883-84.
35 6 8	1 1 8	3.11	0 8	37½	46	...	High yield due to land lying fallow for 30 years previous to 4 years of cropping. Vide Experiment No. 37 of Report for 1884-85.
31 4 0	0 14 11	2.98	0 8	Do.	46	...	Do. do. No. 38 of Report for 1884-85.
83 9 3	11 14 0	14.20	0 5	Do.	38½	400 bundles.	Experiment No. 117.—There was a second crop, but no experimenter was able to get to the field to test it. Incidence, therefore, on the rice alone.
59 14 3	10 7 7	17.48	0 4	Do.	38½	400 bundles.	Experiment Nos. 118 and 119.—Incidence on the double crop comes to 16.37 per cent.
4 1 4	10 7 7	256.50	0 8	Do.	50	1½ leaves; 5½ stalks.	

Summary of Crop Experiment Reports,

Figures in columns 5 and 13

No.	Taluka, Village and Experimenter.	Survey Number or Pot Number.	Net area excluding Pot Kharab.	Assessment of the Field.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formula.	AVERAGE PER		
								Seed.	Yield of	
									Principal Product.	By-Product.
1	2	3	4	5	6	7	8	9	10	11
			A. g.	Rs. a. p.		Annas.	Lbs.	Lbs.	Lbs.	Lbs.
120	Mr. F. X. D'Souza, Assistant Collector. Chikhli (Surkhái) ...	125 Pot No.	...	...	Rice (Kolamb), 11th November 1895 ; followed by	16	2,025	72	2,645 in husk.	3,104 bundles.
	Mr. P. R. Mehta, Sub-Asst. Supt., Guj. Rev. Survey.	3	0 32	8 0 0 (3 0 0 water-rate).						
121	Do. (do.) ...	Do.	Do.	Do. ...	Dolichos lablab (Vál) and Crotonaria juncea (San), 18th March 1896.	10	450	35	92	480 leaves; 240 stalks.
	Mr. Pránálál Harkisandás, District Deputy Collector.									
122	Do. (Thála) ...	130	1 3	8 8 0	Rice (Kada), 24th October 1895 ; followed by	14	1,770	130	2,290 in husk.	4,640
123	Do. (do.) ...	Do.	Do.	Do. ...	Dolichos lablab (Vál), 5th March 1896.	...	...	...	1,157	555
	Mr. A. B. Ffords, Asst. Supt., Guj. Rev. Survey.									
124	Do. (Harangám)...	261	1 8	12 0 0 (4 8 0 water-rate).	Rice (Sukhvel), 13th November 1895 ; followed by	8	1,010	127	1,238 in husk.	6,880
	Mr. P. R. Mehta, Sub-Asst. Supt., Guj. Rev. Survey.									
125	Do. (do.) ...	Do.	Do.	Do. ...	Dolichos lablab (Vál), 18th March 1896.	6	265	60	347	270 leaves; 150 stalks.
126	Do. (Bámanvel) ...	11	1 8	10 0 0 (2 5 6 water-rate).	Rice (Kolamb), 12th November 1895.	12	1,520	114½	1,813 in husk.	6,830
	Mr. B. Robertson, Assistant Collector.									
	Do. (Bodwank) ...	261	6 13	12 0 0	Dolichos lablab (Vál), 8th March 1888.	11	485	67	315	1,280
	Do. (Ohod) ...	171	0 25	6 4 0	Do. 22nd March 1888.	17	770	95	875	2,700

Surat District, 1895-96—continued.

are of the Original Survey.

ACRE.			Area of Test.	Equivalent in Tolas of local weight Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
Total Value of Produce.	Assessment excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.			Principal Product.	By-Product.	
12	13	14	15	16	17	18	19
Rs. a. p.	Rs. a. p.	Per cent.	A. g.	Tolas.	Lbs.	Cwt.	
76 8 4	10 0 0	13.06	0 5	37½	38½	400 bundles.	Experiment Nos. 120 and 121.—Second crop taken 6 years out of 10. <i>San</i> seed used as manure for rice. Incidence on the two crops comes to 11.31 per cent.
11 13 9	Do.	84.32	0 6	Do.	57½ vāl, 68 san seed.	1⅜ leaves; 5⅞ stalks.	
51 1 5	7 14 6	15.47	0 4	Do.	51½	6½	Experiment Nos. 122 and 123.—Price for <i>Kada</i> rice as well as <i>vāl</i> taken by Mr. Prānlāl very high. For reasons given in the analysis values altered. Incidence on the double crop 10.55 per cent.
23 13 1	7 14 6	33.19	0 4	Do.	57½	1⅜ leaves.	
41 3 10	10 0 0	24.24	0 6	35	34½	13½	Experiment Nos. 124 and 125.—Field on higher level than the last and hence suffered to a greater extent from deficient rainfall. Incidence on the two crops 20.28 per cent.
8 1 0	10 0 0	124.03	0 8	37½	57½	1⅜ leaves; 5⅞ stalks.	
59 12 0	8 5 4	13.94	0 4	35	34½	10	Experiment No. 126.—No second crop this year. Incidence on rice alone. There is usually a second crop which is probably not good.
8 7 0	1 14 4	22.47	0 6	37½	62	3½	<i>Vāl</i> after rice. Incidence on second crop only. Second crop is usually not <i>vāl</i> here but <i>juvār</i> . For further details vide Experiment No. 17 of Report for 1887-88.
26 11 6	10 0 0	37.43	0 4	Do.	52	2½	Irrigated <i>vāl</i> following rice. Incidence on the second crop only. For detailed remarks vide Experiment No. 18 of Report for 1887-88.

Summary of Crop Experiment Reports.

Figures in columns 5 and 13

No.	Táluka, Village and Experimenter.	Survey Number or Pot Number.	Net area excluding Pot Kharáb.	Assessment of the Field.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formulae.	AVERAGE PER		
								Seed.	Yield of	
									Principal Product.	By-Product.
1	2	3	4	5	6	7	8	9	10	11
			A. g.	Rs. a. p.		Annas.	Lbs.	Lbs.	Lbs.	Lbs.
127	Mr. F. X. D'Souza, Assistant Collector. Chikhli (Fadvel) ...	863	2 6	22 8 0	Sugarcane (Malbári), 28th November 1895.	18	5,690	1,875 canes.	9,500 gol.	1,360 bundles dry leaves.
128	Do. (Pipal Gabhán)	58	3 36	41 0 0	Do. (do.), 1st December 1895.	16	4,875	1,875 do.	8,160 do.	1,280 do.
129	Do. (Ohod) ...	299	1 22	25 8 0	Do. (do.), 3rd December 1895.	18	5,690	1875 do.	9,260 do.	1,240 do.
130	Párdi (Umarsádi) ... Mr. P. R. Mehta, Sub-Asst. Supt., Guj. Rev. Survey.	896	1 4	7 0 0	Rice (Kada), 16th October 1895 ; followed by	16	1,950	127	2,132 in husk.	3,200 bundles.
131	Do. (do.) ... Mr. F. X. D'Souza, Assistant Collector.	896	Do.	Do.	Dolichos lablab (Vál), 4th March 1896.	16	710	60	809	573 leaves ; 339 stalks.
132	Do. (Bálda) ... Mr. P. R. Mehta, Sub-Asst. Supt., Guj. Rev. Survey.	31 Pot No. 1	... 2 15	... 14 8 0	Rice (Kada), 17th October 1895 ; followed by	14	1,710	74	1,837 in husk.	3,300 bundles.
133	Do. (do.) ... Mr. F. X. D'Souza, Assistant Collector.	Do.	Do.	Do.	Dolichos lablab (Vál), 5th March 1896.	12	535	60	615	520 leaves ; 330 stalks.
134	Do. (Sodhálváda) ... Mr. P. R. Mehta, Sub-Asst. Supt., Guj. Rev. Survey.	12 Pot No. 1	... 3 30	... 17 0 0	Rice (Kada), 17th October 1895 ; followed by	12	1,460	81	1,656 in husk.	3,600 bundles.
135	Do. (do.) ...	Do.	Do.	Do.	Dolichos lablab (Vál), 5th March 1896.	5	220	60	244	240 leaves ; 126 stalks.

Surat District, 1895-96—continued.

are of the Original Survey.

ACRE.			Area of Test.	Equivalent in Tolas of local weight Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
Total Value of Produce,	Assessment excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.			Principal Product.	By-Product.	
12	13	14	15	16	17	18	19
Rs. a. p.	Rs. a. p.	Per cent.	A. g.	Tolas.	Lbs.	Cwts.	
465 10 5	10 7 5	2.25	0 2	37½	21½	67 bundles.	Experiment No. 127.—Natural Bágáyat land growing rice followed by sugarcane every two or three years.
413 3 2	10 8 2	2.54	0 2	Do.	20½	67 do.	Experiment No. 128.—Sugarcane crop practically occupied the land for two years. The incidence on assessment for this period comes to 5.08 per cent.
478 1 1	16 7 2	3.41	0 2	Do.	20½	67 do.	Experiment No. 129.—Bhátá land growing rice followed by sugarcane once in 5 or 6 years.
43 7 6	6 5 9	14.63	0 8.5	Do.	54	800 do.	Experiment Nos. 130 and 131.—Second crop always grown though field without any irrigational facility. Incidence on double crop 10.34 per cent.
18 0 5	Do.	35.27	0 8.5	Do.	57½	1½ leaves, 5½ stalks.	
36 2 5	6 1 8	16.88	0 4	Do.	54	800 bundles.	
14 10 10	Do.	41.58	0 8	Do.	57½	1½ leaves, 5½ stalks.	Experiment Nos. 132 and 133.—Incidence of assessment on the double crop comes to 11.55 per cent.
35 2 8	4 8 6	12.88	0 4	Do.	54	800 bundles.	Experiment Nos. 134 and 135.—The incidence on both crops works out to 10.99 per cent.
6 0 7	Do.	75.06	0 7	Do.	57½	1½ leaves, 5½ stalks.	

Summary of Crop Experiment Reports,

Figures in columns 5 and 13

No.	Taluka, Village and Experimenter.	Survey Number or Pot Num- ber.	Net area exclud- ing Pot Kharab.	Assessment of the Field.	Crop and Date of Experiment.	Local Esti- mate in Annas.	Yield accord- ing to Formu- lae.	AVERAGE PER		
								Seed.	Yield of	
									Principal Product.	By-Product.
1	2	3	4	5	6	7	8	9	10	11
			A. g.	Rs. a. p.		Annas.	Lbs.	Lbs.	Lbs.	Lbs.
136	Mr. F. X. D'Souza, Assistant Collector. Pardi (Palsana) ...	19	1 10	12 8 0 (3 2 0 water-rate.)	Rice (Kada), 18th October 1895; followed by	12	1,460	192	1,697 in husk.	2,780 bundles.
137	Mr. P. R. Mehta, Sub-Asst. Supt., Guj. Rev. Survey. Do. (do.) ...	Do.	Do.	Do.	Dolichos lablab (Val), 6th March 1896.	9	400	60	555	415 leaves; 240 stalks.
138	Mr. F. X. D'Souza, Assistant Collector. Do. (Pardi) ...	501 Pot No. 6	...	...	Rice (Dangi), 27th October 1895; followed by	16	1,950	96	2,309 in husk.	4,200 bundles.
139	Mr. P. R. Mehta, Sub-Asst. Supt., Guj. Rev. Survey. Do. (do.) ..	Do.	Do.	Do.	Dolichos lablab (Val), 10th March 1896.	8	355	60	427	427 leaves; 169 stalks.
140	Mr. Pránál Harkis- cándás, District Deputy Collector. Do. (Umarsadi) ...	589	1 17	13 8 0 (4 0 0 water.)	Rice (Kada), 22nd October 1895; followed by	18	2,275	130	3,346 in husk.	2,784
141	Mr. P. R. Mehta, Sub-Asst. Supt., Guj. Rev. Survey. Do. (do.) ...	Do.	Do.	Do.	Dolichos lablab (Val), 3rd March 1896.	...	...	60	783	1,440
	Mr. Umedram Ranchod- das, District Deputy Collector. Pardi (Balda) ...	43	0 14 (recogn- ised share.)	2 2 0	Rice (Kada), 18th October 1886.	11	1,340	94	537 in husk.	1,146
	Do. (Pardi) ...	1,055	0 19	3 12 0	Do. 19th October 1886.	16	1,950	94	1,444 do.	2,853

Surat District, 1895-96—continued.

are of the Original Survey.

ACRE.			Area of Test.	Equivalent in Tolas of local weight Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
Total Value of Produce.	Assessment excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.			Principal Product.	By-Product.	
12	13	14	15	16	17	18	19
Rs. a. p.	Rs. a. p.	Per cent.	A. g.	Tolas.	Lbs.	Cwts.	
34 14 1	10 0 0	28.66	0 4	37½	54	800 bundles.	Experiment Nos. 136 and 137.—Incidence on the double crop 20.97 per cent.
12 12 7	Do.	78.20	0 8	Do.	57½	1½ leaves, 5½ stalks.	
53 13 11	8 14 2	16.49	0 4	Do.	47½	800 bundles.	Experiment Nos. 138 and 139.—Superior rice on favourably situated land. Incidence on the double crop 13.79 per cent.
10 8 6	Do.	84.37	0 9	Do.	57½	1½ leaves, 5½ stalks.	
68 15 2	9 7 7	13.74	0 10	Do.	51½	6¼	Experiment Nos. 140 and 141.—Very favourably situated field. Values of grain given by experimenter very high. Figures altered as explained in the analysis. Incidence on the double crop 10.75 per cent.
19 3 0	Do.	49.21	0 12	Do.	57½	2	
12 6 10	6 1 1	48.62	0 6	37	50	6	Rice alone usually grown on the land. Season unfavourable. For other remarks, vide Experiment No. 13 of Report for 1886-87.
33 6 1	7 14 3	23.63	0 9	Do.	50	5½	Do. do. vide Experiment No. 14 of Report for 1886-87.

Summary of Crop Experiment Reports,
Figures in columns 5 and 13

No.	Táluka, Village and Experimenter.	Survey Number or Pot Num- ber.	Net area exclud- ing Pot Kharáb.	Assessment of the Field.	Crop and Date of Experiment.	Local Esti- mate in Annas.	Yield accord- ing to Formu- læ.	AVERAGE PER		
								Seed.	Yield of	
									Principal Product.	By-Product.
1	2	3	4	5	6	7	8	9	10	11
			A. g.	Rs. a. p.		Annas.	Lbs.	Lbs.	Lbs.	Lbs.
	<i>Mr. Syad Nuruddin Khán, Assistant Collector.</i>									
	<i>Párdi (Sukhes) ...</i>	106	4 12	17 8 0	<i>Dolichos lablab (Vál), 27th Feb- ruary 1890.</i>	18 to 20	830 to 950	114	1,129	1,290
	<i>Do. (Karáya) ...</i>	136	9 2	6 8 0	<i>Castor-seed, 21st February 1891.</i>	12 to 14	340 to 390	44	455 seed.	.....
	<i>Mr. P. E. Mehta, Sub-Asst. Supt., Guj. Rev. Survey.</i>									
142	<i>Do. (Umarsádi) ...</i>	512	2 36	3 4 0	<i>Do. 3rd March 1896.</i>	12	340	40	198 do.	.....
	<i>Mr. Syad Nuruddin Khán, Assistant Collector.</i>									
	<i>Do. (Kumbhária) ...</i>	131	2 21	2 4 0	<i>Do. 27th February 1890.</i>	12 to 13	340 to 370	38	320 do.	160
	<i>Do. (Dungrí) ...</i>	284	9 16	6 8 0	<i>Gram, 18th Feb- ruary 1891.</i>	12	450	71	408	142
	<i>Mr. F. X. D'Souza, Assistant Collector.</i>									
143	<i>Do. (Umarsádi) ...</i>	761 Pot No. 1	...	...	<i>Elusine coracana (Nágli), 27th October 1895.</i>	14	1,050	21 ₂	1,184	.....
144	<i>Do. (Palsána) ...</i>	61	4 12	6 10 0	<i>Do. 28th October 1895.</i>	12	900	6	827	.....
145	<i>Do. (Sukhláo) ...</i>	171	0 38	0 15 0	<i>Do. 29th October 1895.</i>	16	1,200	5	1,845	.....
146	<i>Do. (Kachwál), ...</i>	214	7 18	14 12 0 (6 12 0 water-rate.)	<i>Sugarcane (Mal- bári and Káli- bhuri), 6th De- cember 1895.</i>	16	4,500	1,500 canes.	9,460 gol.	900 bundles dry leaves.
147	<i>Do. (Panchláí) ...</i>	341 Jiráyat.	1 36 1 13	2 12 0 0 12 0	<i>Do. (do.), 8th December 1895.</i>	20	6,000	1,500 do.	10,020 do.	860 do.
148	<i>Do. (Palsána) ...</i>	60	1 27	22 8 0 (8 6 0 water.)	<i>Do. (do.), 9th December 1895.</i>	16	4,500	1,500 do.	8,320 do.	1,060 do.
149	<i>Do. (do.) ...</i>	363	5 14	39 0 0	<i>Do (Mal- bári and Kha- juria), 10th De- cember 1895.</i>	12	...	1,500 do.	5,520 Sántas or 9 háth canes.	1,000 do. 2,000 stumps.

Surat District, 1895-96—concluded.

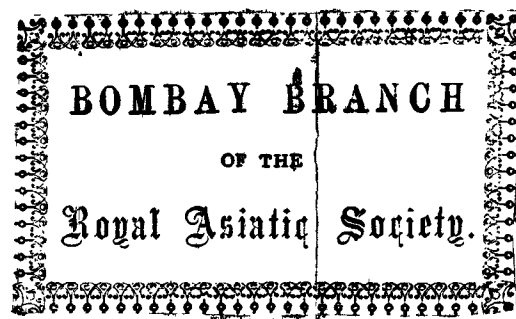
are of the Original Survey.

ACRE.			Area of Test.	Equivalent in Tolas of local weight Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
Total Value of Produce.	Assessment excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.			Principal Product.	By-Product.	
12	13	14	15	16	17	18	19
Rs. a. p.	Rs. a. p.	Per cent.	A. g.	Tolas.	Lbs.	Cwts.	
22 5 3	4 1 1	18.21	0 8	37	57	4½	Second crop after rice. Incidence on the vāl alone. For remarks, vide Experiment No. 21 of Report for 1889-90.
17 15 11	0 11 5	3.99	0 8	Do.	25½	...	Second crop after rice. Incidence on the castor-seed alone. For other remarks, vide Experiment No. 23 of Report for 1890-91.
8 4 0	1 1 11	13.57	0 8	37½	24	...	Experiment No. 142.—Castor alone on poor soil.
16 1 1	0 14 4	5.54	0 8	37	20	...	Castor on poor soil growing castor and kodra in alternate years. Vide Experiment No. 22 of Report for 1889-90.
13 12 0	0 11 0	5.00	0 8	Do.	30½	4	Grown after a year's fallow on black soil usually growing castor once in two years. Vide Experiment No. 22 of Report for 1890-91.
29 3 9	0 11 6	2.45	0 4	37½	40½	...	Experiment No. 143.—This and the following two nágli crops are representative of the crops grown by the better cultivators. Káliparaj men with little tillage grow inferior crops.
20 6 11	1 8 8	7.54	0 8	Do.	40½	...	Experiment No. 144.—Field unmanured for the last three years.
45 8 10	0 15 9	2.16	0 8	Do.	40½	...	Experiment No. 145.—Sheep and goats folded on the field for 2 months which accounts for the high yield obtained.
468 8 9	1 15 8	0.42	0 2	Do.	20½	100 bundles.	Experiment No. 146.—Bhāta land enriched with 400 cart-loads per acre of tank mould and fresh soil from a mango grove put on before beginning to grow cane.
503 13 7	0 9 0	0.11	0 2	Do.	20½	100 do.	Experiment No. 147.—The crop practically occupied the land for two years. Incidence calculated on this period would work up to 0.22 per cent.
447 7 7	13 6 11	3.00	0 2	Do.	19	100 do.	Experiment No. 148.—Sugarcane grown every 4 or 5 years. At other times rice followed by vāl. Crop damaged by jackals.
208 3 2	7 4 8	3.50	0 1	...	28½	100 do. 400 stumps.	Experiment No. 149.—Object of the experiment to find the actual seed-rate, &c., for cane. See detailed remarks in the analysis.

CROP EXPERIMENTS,
BOMBAY PRESIDENCY,
1896-97.

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2/4/10

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FROM

J. W. P. MUIR-MACKENZIE, ESQUIRE, I. C. S., M.R.A.C.,
Survey Commissioner and Director,
Land Records and Agriculture,
Bombay ;

To

J. MONTEATH, ESQUIRE, I. C. S.,
Chief Secretary to Government,
Revenue Department, Bombay.

Poona, 16th September 1897.

SIR,

I have the honour to forward the Analysis of Crop Experiments for 1896-97 prepared by Mr. J. Mollison, Deputy Director of Agriculture.

2. Owing to the demands of famine and plague upon the time of officers, and the extensive failures of crops, officers were excused in most districts from the duty of conducting crop experiments in Government Resolution No. 9672, dated 2nd December 1896, Revenue Department. No experiments have been

The experiments reported against this district are those submitted by the Superintendent, Land Records and Agriculture, S. D. reported from any of the districts in the Central Division, from Belgaum and Bijapur in the Southern Division, and from Thána in the Northern Division. In Dhárwar and Kolába of the Southern Division and Surat of the Northern Division the number of experiments was fewer than usual. In the remaining six districts the programme settled was observed. The crops tested, however, showed in many places yields much below the average.

3. In all, reports on 62 experiments have been received—38 from the Northern Division and 24 from the Southern Division. One test from Kolába has been omitted from the tabulated statement, as in that case the yield of grain was *nil*. Some more tests might have been omitted on account of the abnormally low yields shown. But these have been retained to show what the yield was in localities affected by a season of scarcity ; as also the effect high prices fetched by the produce had in compensating for the smallness of yield.

4. Of the total number, 3 experiments have been reported by the Superintendent, Land Records and Agriculture, S. D., and 4 by Mr. P. R. Mehta, Assistant Superintendent, Gujarát Survey. The rest were done by officers of the Revenue Department. The Superintendent, Land Records and Agriculture, Central Division, and Deputy Director of Agriculture, being on special famine duty, which required them to travel rapidly, did not contribute any experiments. Officers of the Survey Department (except Mr. Mehta, who conducted 4 tests in Surat) for reasons which have been fully explained were unable to conduct any experiments this year. In the Konkan and Deccan there were no crops in the ground in the talukas where the officers were working, and Mr. Sáthe in Gujarát was moving too rapidly to have the necessary opportunity.

5. All the experiments reported are 'ordinary' as in recent years preference is given to these over the 'special' in order to secure as large a number of tests as possible to furnish data for the quinquennial return of outturn statistics required for the Secretary of State for India.

6. The working of the programme has been noticed in detail in the Analysis. The following table exhibits the distribution of tests over the several crops selected for experiment, the crops which are intended to find entry in the quinquennial return being marked with an asterisk ;—

Division.	*Rice.	*Wheat.	*Jowári.	*Báji.	*Nágli.	*Kodra.	*Gram.	*Sesamum.	Castor seed.	Niger seed.	*Sugarcane.	*Cotton.	Total.
Northern Division ...	9	2	5	7	...	6	3	...	4	...	...	2	38
Southern Division ...	7	...	2	...	6	5	...	1	...	1	1	...	23
Total ...	16	2	7	7	6	11	3	1	4	1	1	2	61

7. With the short time left before my start for Europe it is impossible for me to enter into detailed review of the experiments reported from the different districts. Mr. Mollison's review, however, renders minute examination unnecessary, as it enters into almost every point worth notice.

8. In Gujarát a good many cases of high incidence are met with in experiments on dry-crops; chiefly on the *bdjri* crop, which suffered greatly from the unfavourable season. The district of Panch Maháls forms a remarkable exception. Here the dry-crop yields were fair and, at prices prevailing, of high value. There can be little doubt that, as remarked by Mr. Mollison, the assessment of lands in this district is extremely moderate. The fact is worthy of serious attention and recollection when the next proposals for revision settlement are submitted.

9. The remarks of Mr. Phirozsháh Pestonji regarding the condition of the irrigation tanks in the Hānsot Mahál and Ankleshvar táluka of Broach will be brought to the notice of the Survey Officers, who will be directed to comment on the facts disclosed when submitting the settlement reports of the tálukas in question.

10. Mr. Mehta made some interesting experiments in castor seed, showing that in Surat lands growing the crop can stand in ordinary years a very substantial assessment.

11. It is worthy of notice that rice lands, wherever the water-supply was at all adequate, showed a low incidence of assessment.

12. In the Southern Division it is remarkable that in lands growing *ndgli*, though only a miserable crop was produced, the incidence of assessment was never exorbitant. High it was, as it was bound to be in a year of scarcity. It has long been my impression that in this Presidency lands growing *ndgli* are very lightly assessed, although it is true, as stated by Mr. Mollison at page 17 of the review, that the *ndgli* is followed by other crops of less value.

13. Mr. Phirozsháh Pestonji, District Deputy Collector, Broach, Mr. Mehta, Assistant Superintendent, Gujarát Survey, and Mr. V. R. Kelkar, District Deputy Collector, Ratnágiri, are to be commended for the care and interest they displayed in their experiments.

14. There were fewer cases than usual of glaring inattention to rules. It would double the value of work if such rules were really minutely and carefully observed, as that the crop selected is an average one for the locality, and that the weight of grain in the measures used should be carefully ascertained.

15. Greater attention is perhaps required to the ascertainment of the anna estimate. It has always to be remembered that 16 annas is to represent not a bumper crop, but a good average crop. It is seldom much use to ask the cultivator at how many annas he values his crop. He probably seldom expresses his estimate in annas. It would be better to ask him how many *pailis* or well known local measures the field (1) usually produces, and (2) has produced in the season of experiment. The ratio of (2) to (1) can then be expressed by the experimenter in annas, which will represent pretty closely the cultivator's real estimate of the value of his crop.

16. But for inevitable delays in printing due to stress of special work at the Press this report would have reached Government as desired by the 1st September.

I have the honour to be,

Sir,

Your most obedient Servant,

J. W. P. MUIR-MACKENZIE,

Survey Commissioner and Director,
Land Records and Agriculture.

ANALYSIS OF CROP EXPERIMENTS.

NORTHERN DIVISION.

Ahmadabad.

Eight experiments have been reported from this district. Messrs. Robertson and Carvalho carried out the tests required of them. Mr. Mead conducted only two tests. He was prevented from undertaking the third test owing to his transfer to Thána. Mr. Carvalho had made one more experiment at Viramgám; but having to return to head-quarters he had entrusted the produce to the care of a Kárkun in the Mámlatdár's kacheri. On return he suspected the crop to have been tampered with and abandoned the test.

Mr. L. Robertson, Assistant Collector,

Reports three experiments: one on *bájri* and two on rice.

This officer's first experiment (No. 1) was taken on *bájri* grown on highly assessed *gorádu* soil which apparently grows the same crop with a subordinate mixture every year. The revision assessment is Rs. 8-15-0 per acre. I would infer from this that the land is capable of growing a more paying crop than *bájri* and has advantages not disclosed by the experimenter's report, which is meagre in explanatory remarks. The crop is estimated at 13 annas and the incidence of assessment is over 30 per cent. The experimenter should have endeavoured to explain the high incidence. The crop is reported to have been as good as any in the village and a good example of timely sowing. There was a subordinate mixture of *gurvár* (cluster bean) and *ratolia* which was not tested, but which for home use was valued at Rs. 6. This, however, is not included in the gross value of outturn. The *bájri* yielded 323 lbs. grain per acre worth Rs. 11-10-9. The by-product was not weighed, but was valued at Rs. 17-8-0 per acre; this for *bájri* straw is very high.

Mr. Robertson's second and third experiments (Nos. 2 and 3) were taken on transplanted *Sutarsál* rice grown on embanked land which has been brought under tillage by the Salvation Army. The first of these fields had been waste for many years. It was broken up in 1895 and rice was sown in that year, but the crop dried up and did not yield much. The land was properly embanked before the tested crop was sown and a very good outturn obtained. It is not reported when the second field was first brought under tillage; apparently it has been longer cultivated than the other. It bears an assessment of Rs. 6-3-3 per acre, whilst that of the first field is only Rs. 2-0-4.

The first field produced 2,154 lbs. grain per acre; the second only 974 lbs. No manure was given to either fields. The first field probably did not need manure, as it was reclaimed so recently from waste. The season was bad, the late rains being deficient. The first field was not irrigated; the second got two waterings from a well. The reported seed rates, *viz.*, 5 lbs. per acre for each field, are much under-estimated. The proportionate area of seed-bed to area of transplantation is not reported. The incidence of assessment is 2.98 per cent. for the first field and 19.65 per cent. for the second. The former is very low and the latter not high for a 9-anna crop.

Mr. P. J. Mead, Assistant Collector,

Reports one test on *juvár* and another on rice.

The former (Exp. No. 4) was taken on *gorádu* soil assessed at Rs. 2-9-11 per acre. The outturn, 186 lbs. grain and 4.25 bundles of *kadbi* per acre, is much over-estimated at 10 to 12 annas. The experimenter reports that the villagers stated that in a good year they would get 40 maunds of grain per acre, *i.e.*, eight to nine times as much as the outturn of the tested crop. The variety of *juvár* was apparently *sundhio*. I infer this from the seed rate, 61½ lbs. per

acre. *Sundhio* requires a high seed rate. It is a common crop in the *gorádu* soils of Ahmadabad and Kaira. The fodder of this variety is specially valuable, the stalks being very thin and fine. The field was heavily manured, about 30 loads per acre of ordinary manure having been given in May. The seed was not drilled until August, and as there was no late rain, the crop ripened prematurely. The grain was light and thin. *Sundhio* grain even when fully developed is not nearly so plump and large as that of most other varieties. The grain and *kadbi* were worth respectively Rs. 7-14-1 and Rs. 12-2-3 per acre. The incidence of assessment is 13·08 per cent.

Mr. Mead's test on *Kamod* rice (No. 5) gave more satisfactory results. This variety needs a good deal of water to produce a full crop. The seedlings were not transplanted until September, and as the crop was not reaped until December, it probably benefited by about 75 cents. of late November rain. The field has *gorádu* soil assessed at Rs. 5-10-2 per acre. It gets water from a tank; 4 waterings were given; the water was raised by a *jhil*, which is a scoop lift swung by two men. This means of lifting water is laborious. The field was carefully tilled and well manured; 24 loads of ordinary manure were applied per acre. The experimenter values the manure at Rs. 2 per cart-load. The carts of the district are large; but if the manure was purchased, it could, I think, have been bought at a cheaper rate. If it was home made, the crop might fairly be debited with the manure at a cheaper rate.

The crop is, I think, considerably under-estimated at 12 annas. It yielded 2,256 lbs. grain and 3,692 lbs. straw per acre, together worth Rs. 85. The incidence of assessment is only 6·63 per cent. The cost of cultivation inclusive of manure must have however been heavy.

Mr. H. F. Carvalho, District Deputy Collector,

Reports one test on *juvar* and two tests on wheat.

The *juvar* (Exp. No. 6) was grown on black soil assessed at Re. 1-2-3 per acre. The field grows cotton, *juvar* and wheat in indefinite rotation. The outturn of grain is extremely poor and indicates the generally disastrous effect of the season. The field was submerged by heavy unseasonable rain and subsequently there was drought through failure of late rains. No manure was applied this year, but the tillage was good in other respects. Eighteen pounds seed drilled in July produced in November, on the best portion of the field, a crop which yielded only 110 lbs. grain and 2,633 lbs. useful by-product. On about $\frac{1}{3}$ rd of the field there was little or no crop, and this portion was excluded in selecting test areas. The grain was valued at the high rate (for an ordinary season) of 24 lbs. per rupee and the by-product at Rs. 8-11-9 per acre. The incidence of assessment is 8·56 per cent. The crop is much over-estimated at 8 annas.

The wheat fields experimented upon by this officer (Exp. Nos. 7 and 8) had each *jirayat* black soil and grew cotton and wheat in alternate years. The first field bears a higher assessment than the second, the respective rates being Rs. 3-10-7 and Rs. 1-15-4 per acre.

The seed was drilled in each field in November; 51 lbs. per acre in the first field, 41 lbs. per acre in the second. The latter rate is somewhat under average. Tillage is described as good in each case, but no manure was applied. The season is reported favourable, prospects having been much improved by the November rain.

Outturn, &c., results were as under:—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		Principal Product.	By-product.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
First field (Exp. No. 7) ...	12	520	322	32 15 5	3 10 7	11·10
Second field (Exp. No. 8) ...	12	540	269	27 9 10	1 15 4	7·09

The wheat grown in the second field was a red variety of inferior kind and the grain is therefore valued at a cheaper rate than that of the first field. In both cases the market rates are considerably higher than in normal years, prices having risen owing to scarcity in other districts.

Kaira.

Experimenters were asked to take two tests on *bajri* and to select for their other tests *kodra*, *ra'gi*, gram and sugarcane in the order of entry. Mr. D'Souza conducted two tests on *bajri* and two on *kodra*. Mr. Modi did one experiment each in *bajri*, rice and gram. He has also reported one experiment on *bajri* and another on *kodra* conducted by Mr. Jivanlál Pránjivandás.

Mr. F. X. D'Souza, Assistant Collector,

Submits four tests: two on *bajri* and two on *kodra*. One crop of each cereal is representative of the best crops in the experimenter's charge, whilst one of each represents the poorer crops. The latter largely predominated. All the experiments were taken in the same village during three consecutive days.

The two *bajri* experiments (Nos. 9 and 10) may be advantageously contrasted. The first crop was selected as representing about the best crop of the season, the second as showing the average yield of at least 80 per cent. of the *bajri* in the taluka this year. The entire failure of the latter rains was everywhere very disastrous to *bajri*. The fields are *jirayat*. The soil is probably *goradu*, though the experimenter does not say so. The respective assessments are Rs. 5-4-11 and Rs. 4-13-10 per acre. The first field grows tobacco in a portion every year and *bajri* and pulses in the remainder. The second field grew, during the past three years, (1) barley, (2) wheat and (3) barley, *kodra* and *tuver*. The crops grown in both fields indicate that each field has a well or other source of irrigation.

The first field had *math* subordinate to the *bajri*, but the pulse was practically a failure. The subordinate crops in the second field were *math*, *mag*, *val* and *tuver*. These were not tested and the experimenter does not report whether they promised well or not. It is not likely that any of the pulses except *tuver* yielded much. But *tuver* owing to its power of resisting drought was by no means a bad crop in the Kaira district; and probably in the field of experiment it gave a fair or good outturn. Both fields were manured with ordinary manure: 22 cart-loads per acre in the first field and 11 in the second. The cultivator of the first field is a Pátidár and of the second a Girásia.

The outturn results were as under :—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		Principal Product.	By-product.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
First field (Exp. No. 9) ...	13	615	4,308	45 12 6	5 4 11	11·59
Second field (Exp. No. 10) .	3	108	725	6 11 3	4 13 10	72·57

I also contrast the *kodra* tests (Nos. 11 and 12). The first field represents about 5 per cent. of the total *kodra* area of the taluka; the second field, about 80 per cent. of the total area. In the first field *kodra* was sown alone, whilst in the second *tuver* was subordinate. The pulse was not tested, and for reasons already referred to it probably yielded well. The first field grows the ordinary dry crops *juvár*, *bájri* and pulses and *kodra* in rotation. The second field grows chiefly *kodra* alone or with *tuver*. No manure was given to either field this year. The cultivator of the first field is a Pátidár, of the second a Káchia.

Outturn, &c., results were as under :—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		Principal Product.	By-product.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
First field (Exp. No. 11) ...	13	959	2,051	27 13 9	4 7 1	15·94
Second field (Exp. No. 12).	3	333	500	8 7 0	4 3 10	50·24

Mr. B. E. Modi, District Deputy Collector,

Submits five tests : two on *bājri*, one on *kodra*, one on rice and one on gram, Though all the tests are submitted by Mr. Modi, two of them, *viz.*, one of the tests on *bājri* and that on *kodra* (Nos. 16 and 17), were conducted by Mr. Jivanlál Pránjivandás, who acted as District Deputy Collector during Mr. Modi's absence. Mr. Jivanlál ought to have reported his own experiments. I report them with some misgiving.

The *bājri* experiments (Nos. 13 and 16) clearly indicate the disastrous effect of the season on the crop throughout the district. Both fields have *gradu* soil and are assessed respectively at Rs. 5-6-0 and Rs. 4-12-9 per acre. They grow *bājri* with subordinate pulses annually. The subordinate pulses were not tested. The first field was lightly manured with about 3 cart-loads ordinary manure per acre. The second field got no manure since 1894. The season was characterised by heavy downpour early in the season and scant rainfall later. Each field was sown in June and reaped in October. The crops are, I think, over-estimated at 5 and 4 annas respectively.

Outturn, &c., results were as under :—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		Principal Product.	By-product.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
First field (Exp. No. 13) ...	5	97	513	8 9 1	5 6 0	62·73
Second field (Exp. No. 16).	4	77	436	5 0 0	4 12 9	95·93

Mr. Modi's rice test (No. 14) was taken on embanked land, the soil being *besar*, *i.e.*, a stiff loam. The field grows the same crop every year and is assessed at Rs. 9-9-7 per acre. The variety grown was *Jhini sál* or *Jira sál*, which is a superior sort. One *bigha* (=24 gunthas), in which 70 lbs. of seed were broadcasted, gave seedlings sufficient for 10 *bighas* (=6 acres). This is equivalent to 4 gunthas of seed-bed per acre of plantation. The seedlings were transplanted in August and the crop ripened in November. The seed-bed only was manured, 20 cart-loads ordinary manure being given per acre. Leaves of *Verkhada* tree were also spread on the seed-bed. The seed was made to germinate before it was sown, by steeping in water for a day ; then it was put on a floor and covered with a quilt. The heap was turned daily and sprinkled with water for four days, and when the seed had fully germinated it was broadcasted in the seed-bed. When the late rains failed, the crop was irrigated twice in September from the Khári Cut.

The outturn was excellent : 2,658 lbs. grain and 2,338 lbs. straw per acre together worth Rs. 93-10-0. The incidence works out 10·25 per cent., a moderate figure even for a full crop.

The gram (Exp. No. 15) tested by Mr. Modi gave a middling outturn. The field ordinarily grows wheat, but gram was taken this year as there was not sufficient moisture for wheat. The reported seed-rate, 66 lbs. per acre, is high. The field was repeatedly ploughed during the monsoon. The seed was sown early in November through a single tube fixed behind an ordinary plough, so that the seed dropped into every furrow. The crop ripened early in February and produced 390 lbs. grain and 372 lbs. useful by-product, together worth Rs. 16-8-6. This in local opinion was a 18-anna outturn. This probably is too high an estimate. The assessment is Rs. 3-9-2 per acre and the incidence 21·61 per cent.

Kodra tested (No. 17) on *gorádu* soil yielded well considering the character of the season. The field was manured with 12 carts per acre ordinary manure. It grew wheat both in 1893-94 and 1894-95. In 1895-96 the crop was a mixed one of *kodra*, *tuver* and *tal*. This is a common mixed crop and is considered much less exhaustive than *kodra* alone. The seed was sown seasonably early in June. The reported seed-rate, 9½ lbs. per acre, is under average. The crop ripened in October and yielded 1,026 lbs. grain and 1,641 lbs. by-product per acre, together worth Rs. 21-9. The assessment is Rs. 5-11 per acre and the incidence 26·49 per cent. The crop is said to have suffered much from the scantiness of late rainfall, but to a less extent than other crops in the neighbourhood, owing, it is reported, to better management.

Panch Maháls.

Two experiments on *bájrí* in the Western Maháls and two on gram in the Eastern Maháls were ordered to be carried out. For the remaining tests the experimenters were asked to choose one or two of the following:—*kodra*, *rági*, rapeseed or sesamum. Mr. Wales carried out two experiments on *bájrí* and one on *kodra*. Mr. Heblikar did two on gram.

Mr. J. A. G. Wales, Assistant Collector,

Reports one *kodra* test and two on *bájrí*. The respective outturns are very fair, and indicate that the season was by no means so bad as in other parts of northern Gujarát.

The *kodra* crop experimented upon (No. 18) was grown on *gorádu* soil assessed at Re. 0-11-1 per acre. The field was waste in 1893 and 1894. In 1895 *kodra* and *banti* were grown. The tillage of the tested crop is described as, "poor; seed simply flung in; no weeding." The seed-rate, 82 lbs. per acre, is about three times higher than ordinary. The seed was broadcasted early in June. The crop ripened late in October and yielded 864 lbs. per acre grain worth Rs. 16-13-5. This was locally estimated as a 4-anna crop. It could very well bear a higher estimate. The by-product was not valued, being useless as fodder. The incidence of assessment, 4·11 per cent., is very moderate.

This officer's *bájrí* tests (Nos. 19 and 20) were also taken on *gorádu* fields which grow the same crop with subordinate pulse mixtures from year to year. The subordinate crops were not tested. The experimenter apportions the areas under the cereals and pulses in reference to the quantity of seed sown; but this is an entirely wrong principle. Both fields were manured with ordinary manure; the first with 13½ cart-loads and the second with 3 per acre. The cultivation is described as fair. The reported seed-rates are high.

The *bájrí* straw is perhaps overvalued at Rs. 15-8-7 and Rs. 13-11-8 per acre, although no doubt it was more valuable than in ordinary years.

Outturn, &c., results were as under:—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		Principal Product.	By-product.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
First field (Exp. No. 19) ...	8	449	2,525	34 8 11	0 15 4	2·77
Second field (Exp. No. 20)...	12	385	2,231	31 9 4	1 0 11	3·34

Apparently the higher anna estimate of the second field takes count of the subordinate pulse mixture which, although not tested, was considerable in this field, but small in the other.

Mr. B. R. Heblikar, District Deputy Collector,

Submits two tests (Nos. 21 and 22) on two varieties of gram taken on light brown *gorádu* soil which grows second crops after maize every year. The second crops are ordinarily wheat, barley or gram. Much of the Panch Maháls land is virgin soil, or at least an exhaustive system of cropping has not yet exhausted or probably has not much impaired its natural fertility which at reclamation was very great. Tests taken in former years prove that soil such as that of the fields tested is so fertile that it could very well bear a higher assessment than revision rates. Mr. Heblikar's tests point to the same conclusion.

The first field was lightly dressed with two loads per acre manure for the rain crop (maize). The second field got no manure. The season, owing to deficient late rain, was "not so good as could be desired." The tillage is described as indifferent. Yet the crops yielded well. If, as reported, the outturns represent 8-anna crops, the burden assessment is extremely light. The value of outturn is of course enhanced this year by higher prices than those of ordinary years.

Outturn, &c., results were as under :—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		Principal Product.	By-product.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
First field (Exp. No. 21) ...	8	402	394	17 12 0	2 4 0	12.67
Second field (Exp. No. 22)...	8	361	382	15 15 9	2 10 1	16.45

Broach.

Experiments on *juvár*, rice and cotton were directed to be taken. Only four tests have been reported. Mr. Painter did one test on cotton and one on *juvár*; Mr. Phirozsháh one on rice and Mr. Sorábsháh one on cotton. Mr. Phirozsháh could not complete the programme owing to an injury to his hand which obliged him to go on 2 months' leave. Mr. Painter's charge was heavy, and he had besides to go up for the Higher Standard departmental examination. Mr. Sorábsháh's failure to do the full number has not been explained.

Mr. H. L. Painter, Assistant Collector,

Submits one test each on cotton and *juvár*.

The cotton experimented upon (No. 23) was grown on black soil, which grew wheat in 1895-96 and was unsown in 1894-95. The wheat crop of 1895-96 was a failure. It is reported that sheep were folded on the land in May and subsequently 30 loads of cowdung per acre were applied. It is not at all likely that such a heavy dressing was given, particularly as little or nothing had been taken out of the land during the two previous years. The season is described as ordinary. Though late it was generally fairly good throughout Broach, the November rain being generally beneficial. The field was selected by Mr. Phirozsháh Pestonji, District Deputy Collector, who supervised the first picking. Mr. Painter completed the experiment. Only two pickings were made. After the second picking there was no prospect of more produce. So the plants were uprooted. Both pickings are valued at the same rate, Rs. 71 per *bhár* of 960 *sers*. This is considerably less than the average rate for the whole season. The market rate is said to have varied very little during the interval between pickings. The crop was apparently not watched between pickings and may have possibly been tampered with. If the cultivator expected the same officer to supervise both pickings, he would not have risked surrepti-

tious picking because such would be easily detected by any one with ordinary powers of observation, unless done in a deft, cautious manner. The acre outturn came to 314 lbs. seed cotton* worth, with by-product valued at 10 annas, Rs. 23-4-5. This, judging from the Surat tests of last year, represents a very middling crop for Broach.

Juvár (No. 24) on *jiráyat gorádu* soil of fairly good quality produced a very good crop. The field grew (1) cotton, (2) rice, (3) *juvár*, and (4) *kodra* and rice during the past four years. It was this year manured with 20 loads of manure per acre. Late November rains helped the crop very much. The experimenter reports that the land of this village of experiment is specially fertile. The total outturn came to 1,436 lbs. grain and 520 bundles or 1,040 lbs. of *kadbi* and 390 lbs. chaff all worth Rs. 31-15-5. The grain is priced high at 20 *sers*, i. e., about 20½ lbs. per rupee on account of famine elsewhere.

Mr. Phirozsháh Pestonji, District Deputy Collector.

Mr. Phirozsháh's rice test (No. 25) was taken on *Sukhvel*, a fine and late ripening variety which is grown every year without any rotation on good deep black soil assessed at Rs. 9-10-0 per acre. A second crop of tobacco was taken in 1894-95. But this was rather exceptional, because fine rice which is usually grown on the field is not ordinarily harvested before the first week of December. About 37 carts per acre of farm-yard manure was applied to the field on the first fall of rain. All the manure was home produce, the cultivator having 14 plough bullocks, 6 buffaloes and 8 cows. The seed bed was not manured in any special way. About 5 gunthas of the seed-bed supplied seedlings sufficient for a field of 36 gunthas: About 86 lbs. of seed was used per acre, which is about average for Surat and Broach, though much higher than the formulæ rate. The rains as elsewhere were entirely absent after the middle of August. But the crop was saved by 8 waterings in November and December from the village tank, which had been repaired in the previous year, and hence contained a good supply of water. The outturn came to 1,613 lbs. grain and 2,370 lbs. of straw, together worth Rs. 79-10-8. Both grain and straw have been valued high owing to high prices prevailing owing to scarcity elsewhere in the Presidency. Making all allowances for the cost of cultivation, which had been increased this year owing to artificial waterings for which water had to be lifted each time, the experimenter thinks the cultivator must have earned a fair profit. This result he attributes entirely to the tank having been recently repaired and made capable of holding a sufficient supply of water.

With respect to selection of the test field the experimenter observes :—“The peculiarity of the season of 1896-97 was this, that although the rainfall as a whole was abundant, it was almost entirely crowded into the earlier part of the season. As a consequence rice was a failure in those villages in which the tanks, either on account of their being too small or of their being silted up, did not hold a sufficient supply of water for use during the latter end of the season. In Umarváda, the village of test, the tank is not only one of the largest in the *táluka* but it happened to have been repaired just before the rains and the village was therefore selected as being well suited for a rice experiment in such a season as we have passed through. It was intended for purposes of contrast to test a rice bed in another village where the conditions had been less favourable, but I soon found that in this class of villages the rice crop had failed so hopelessly that no experiment there could serve any useful purpose. Umarváda as a whole did very well considering the character of the season. And the field experimented upon was by no means above the average. Almost every field commanded by the tank had a fair crop.”

The experimenter concludes by observing :—“Most of the irrigation tanks in the Ankleshvar *táluka*, inclusive of the Hánsot Mahál, have hopelessly silted up, and the rate at which they are being repaired is so slow that it may be 20 years before the work is completed. In the meanwhile the majority of holders of rice beds will incur heavy losses in seasons of deficient or ill-distributed rainfall and the extension of rice cultivation be interfered with. In parts of Ankleshvar and Hánsot there is scope for such extension, and rice would pay better than almost any other crop. If there were a reasonable certainty that tanks would be repaired at regular intervals, the people under proper encouragement would do everything else.”

In reference to Mr. Phirozsháh's remarks it might be pointed out that if the occupants of the rice fields took the trouble jointly of cleaning out the tanks which command their fields annually, the cost would be individually a very light burden and the advantage great. The work could be done at a season when there is practically little or no other work to do.

Mr. Sorábsháh Hormasji, District Deputy Collector,

Submits one test (No. 26) on cotton. The field has black soil assessed at Rs. 3-6-11 per acre. Wheat and cotton are grown in alternate years. The field was not this year manured. A light dressing was given last year. Tillage is described as good, but the season was unfavourable. The seed had to be twice sown owing to damage by heavy rain. The second sowing in September was unseasonable. The crop gave a poor outturn and is much over-estimated at 13 annas. The experimenter says that three *dhadis* of seed cotton or 144 local *sers* (= about 148 lbs.) represent an average crop. This is entirely wrong. An average crop on good black soil in Broach is well over 400 lbs. of seed cotton per acre. There were four pickings, which gave the following results:—

Pickings.				Date of picking.	Outturn of seed Cotton per Acre.		Rate per 960 Sers.	Value of Outturn per Acre.
					Sers. Tolas.		Rs.	Rs. a. p.
1st	...	...	...	12th March ..	10	8	84	0 14 3
2nd	...	...	...	2nd April ...	74	20	78	6 0 10
3rd	...	...	...	26th April ...	33	0	77	2 10 4
4th	...	...	...	13th May ...	1	12	65	0 1 5
								9 10 10

Hundred *tolas* of seed cotton from the third picking was ginned and gave the following results:—

Lint $34\frac{1}{2}$ *tolas*; seed 64 *tolas*; and waste $1\frac{1}{2}$ *tolas*.

Surat.

Eight experiments have been reported by sub-divisional officers from this district. Of these Mr. Pránlal conducted six. Other officers were prevented from carrying out the programme chiefly on account of work in connection with the suppression of the plague.

Mr. P. R. Mehta, Assistant Superintendent, Gujarát Revenue Survey, has submitted four experiments on castor seed.

Mr. C. N. Seddon, Assistant Collector,

Submits one test (No. 27) on *juvár*. The crop was grown on black soil of the light *kankari* variety. The assessment is Rs. 3-10-6 per acre. Cotton and *juvár* are alternately taken without any manure. The experimenter states that "about a dozen years ago the land was broken up, having been grass land before and it has never been manured. It is a common practice in Jalálpor to crop with cotton and *juvár* for a score of years and then to leave under grass for 10 or 12 years. This of course is only done when the cultivator has a good deal of land all of which he cannot manure. It also depends upon the amount of rice land and the number of beasts he has—in fact, upon his power to manure." Season was unfavourable and the crop suffered owing to absence of September rains. Tillage was ordinarily good. The cultivator is a Lewa Kanbi. The pulse mixtures were mostly a failure. *Tuver* was sown, but it came to nothing. There were only a few plants of *choli*. *Mag* gave only 12 *sers* pulse per acre. The outturn came to 863 lbs. of *juvár* grain, 12 lbs. *mag* pulse, unripe *juvár* heads worth about 13 annas per acre, and 270 bundles of *kadbi*, all valued at Rs. 36-0-4. The incidence comes to 10·15 per cent., which is very moderate.

Mr. Pránlal Harkisandas, District Deputy Collector,

Submits four tests on rice and two on *kodra*.

The first rice test (No. 28) was taken on *bhāta bāgāyat* land, the others (Nos. 29—31) on ordinary black rice land. All the fields grow rice of an inferior variety, *Kada*, followed by *vāl* every year. The occupant of the first field said he applied 23 carts per acre of cowdung; but the experimenter doubts whether the quantity was really given. The other fields are said to have been manured with 40 loads per acre. This probably is also an over-estimate. The seed-rates, 130 lbs. per acre in the first two tests and 120 lbs. per acre in the last two, are probably 50 per cent. higher than average. Tillage is described as bad in the first field, good in the second, and very good in the last two. Season indifferent for the first crop, fairly good for the second, and good for the third and fourth. With regard to the first field, the experimenter states that it had water available from a tank which was quite close to it. But the owner had many fields to attend to, and the crop suffered both from want of sufficient manure and from deficient irrigation. The second field was somewhat weedy and not well-looked after. The third and fourth fields were rented by a potter and a Bohora from the Anawala Desaies of Chikhli. The terms of lease ought to have been reported. The tenants managed their fields well and got excellent outturns though the season was not quite favourable.

The outturn results were :—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		Principal Product.	By- product.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
First field (Exp. No. 28) ...	8	1,793	3,200	54 6 9	17 13 8	32·80
Second field (Exp. No. 29) ...	12	2,861	3,520	75 13 9	11 5 4	14·94
Third field (Exp. No. 30) ...	16	3,298	4,210	91 15 9	8 7 9	9·22
Fourth field (Exp. No. 31)...	16	3,231	4,060	90 3 11	10 7 3	11·58

Incidence is high in the first field owing to unfavourable season and indifferent tillage. Second crops are invariably grown on all the fields. The value of the second crops, the cost of cultivation being trifling, will reduce the incidence in all the tests.

The *kodra* crop (Exp. No. 32) in one field was grown on light brown *gorāt* soil; in the other (Exp. No. 33) on black soil. In the first, *kodra* is grown every year without manure. In the second, *nāgli* is grown for two years followed by *kodra* in the next two. Season was fairly good, but tillage was indifferent.

The outturn results were :—

	Anna Estimate	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		Principal Product.	By- product.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
First field (Exp. No. 32) ...	12	1,599	2,295	40 10 7	0 15 1	2·34
Second field (Exp. No. 33) ...	12	2,017	2,570	50 4 9	1 6 1	2·74

The by-product, which is generally regarded as useless, has been over-valued at Rs. 2-8-9 and Rs. 2-13-8 per acre.

Mr. Jivanlál Pránjivandás, District Deputy Collector,

Sends one test (No. 34) on *juvār*. The experiment has been reported without any explanatory remarks. The experimenter simply observes that the crop selected represented an average crop of the season, being neither very good nor abnormally poor. The test was taken on black *richania* soil assessed at Rs. 2-5-7 per acre, and growing cotton and *juvār* with pulse mixtures in alternate years. The season was characterised by heavy early rains and no late rain until November. The *juvār* crop throughout the district was in consequence considerably under average. No manure was used. Tillage is reported to be good. About 6½ lbs. of seed sown in July produced early in January 457 lbs. of grain and 250 bundles of *kadbi* per acre together worth Rs. 24-4-11. The incidence works out to 9·66 per cent., which for an 8-anna crop is very moderate.

Mr. P. R. Mehta, Assistant Superintendent, Gujarát Revenue Survey,

Submits four tests on castor-seed; two were taken in Balsár and two in Párdi talukas.

Mr. Mehta prefaces his report with some general remarks, which are quoted almost *verbatim*. He says the soil in which castor is grown is mostly poor. In places it is level, but it is generally uneven. Such lands grow castor in the first year followed by *kodra* with or without pulse (generally *tuver*) in the second year; the third year the same crop is grown, and in the fourth the same crop or castor; or the land is allowed rest for one or more years. Where it is even, and does not contain much lime, the period of fallow is short—one or two years; but where it is uneven, and full of lime, it is kept fallow for a longer period. The cultivators say that after growing *kodra* for two or more years, so much of *agio* (*styga*), a root parasite which is harmful to all cereals, also sugarcane, grows up that the *kodra* crop is nearly destroyed. Many fields which would grow fair crops of sugarcane become, in case of these soils, unfit for sugarcane plantations on account of this parasite. *Juvār* could be grown on higher grounds, in spite of the heavy rain of these talukas, but for the presence of this pest. *Bábhul* grows well in these soils; it takes from 15 to 20 years to reach a good marketable size. Párdi is apparently better suited for *bábhul* than Balsár. The value of the trees standing in favourable situations more than pays the assessment. But there is no systematic sowing or special cultivation. All that is done is to fence the land to keep out cattle and especially goats. It yields grass for three or four years and some grazing after the plants have grown tall enough to be beyond the reach of goats. The trees are not thinned out when young. They, therefore, grow thin and tall, and are easily laid low by high winds during the monsoon.

The field of the first experiment (No. 35) is uneven and full of lime nodules. It has grown every year rice (in a small bit), *kodra*, castor, and *nágli* in one portion or other over about two acres. The rest of the land lies fallow. The portion under experiment was kept fallow for over 15 years. It was broken up only in the current season. It was ploughed five or six times. The season was very unfavourable to the rabi crops in Balsár; and, had it not been for the late showers in November, no outturn would have been gathered. As it was, the crop did not exceed 8 annas throughout the taluka.

The field in the second experiment (No. 36) is level. From 1880 to 1885 it was wholly fallow. Since then, it has grown *juvār*, *kodra*, and castor in about half the field, the other half being left alternately fallow. It grows grass tall enough for cutting. The field is rented by a Koli, who pays the assessment and nothing more. Season, &c., as above.

The third test (No. 37) was taken on a large field extending over 19 acres, which was covered with *bábhul* plantation for the last 18 or 20 years. The *bábhul* was sold standing for Rs. 150 last year. It was ploughed six or seven times during the monsoon. The owner, a Desái, cultivates it in partnership with Dhorias. The owner pays the assessment and the Dhorias supply all the labour. The owner advances seed and receives back an equal quantity from the produce. The produce is apparently equally divided between the owner and the Dhorias. The season was extremely favourable for castors in Párdi. The heavy showers at end of November greatly benefited the crop.

The fourth test (No. 38) was taken on an *ovania* field, *i. e.*, field situated in an *ovan* or water-course. The land is to all intents and purposes a *kidri*. The rain water is impounded in the field by a *bándh* at the lower level. The *bándh* is broken open after the rains and castor-seed is drilled in. Such lands ought to have been classed as *kidris* at the original survey. In many cases, they are situated between *kidri* numbers. They were probably not classed as *kidris*, because they did not grow rice. Many of them now grow rice and some even sugarcane. They are classed as new *kidris* in revision survey. Castors grow well in these lands even though taken annually without any rotation with other crops. In the revision survey the *ovania* portion, *i. e.*, about one acre out of the whole field of about $10\frac{3}{4}$ acres, is classed as new *kidri* and in the rest the old classification has been confirmed.

The outturn results were as follows :—

	Anna Estimate.	Outturn of Seed per Acre.	Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assess- ment.
	As.	Lbs.	Rs. a. p.	Rs. a. p.	
First field (Exp. No. 35) ...	8	125	6 6 10	0 15 9	15.30
Second field (Exp. No. 36)...	6	126	6 7 11	1 8 3	23.30
Third field (Exp. No. 37) ...	18	324	16 9 10	0 10 11	4.10
Fourth field (Exp. No. 38)	14	350	17 15 3	0 12 8	4.41

Tha'na.

As crops were decidedly below the average throughout the district, the Collector directed his Assistants, in conformity with the permission given in Government Resolution No. 9672 of 2nd December 1896, Revenue Department, not to undertake any experiments during the season.

CENTRAL DIVISION.

During the year no crop experiments were carried out in any of the districts in this division. Excessive rain early in the season and its total failure later on had a very disastrous effect on most of the crops. In places they entirely failed and elsewhere were considerably under average. Thus there were few crops fit for being experimented upon. Besides, district officers had much extra work to do in connection with the then impending famine and the plague, and it was thought desirable to relieve them from this part of their work. The necessary permission was granted by Government in their Resolution No. 9672, dated 2nd December 1896, Revenue Department.

SOUTHERN DIVISION.

Belgaum.

Only three experiments by Mr. Lushington, Superintendent, Land Records and Agriculture, Southern Division, have been received for this district. The sub-divisional officers conducted no experiments under the exemption granted by Government Resolution No. 9672, dated 2nd December 1896, Revenue Department.

Mr. J. L. Lushington, Superintendent, L. R. and Agriculture, S. D.,

Submits three tests, two on rice and one on *nāgli*, all taken in the Khánápur taluka of Belgaum.

The first rice experiment (No. 39) was taken on mixed red soil which grows the same crop every year. The field is situated on high level, and in consequence the heavy early rains caused no damage. The crop was raised from drilled seed (60 lbs. per acre) sown with a 6-coulter drill in May. A light dressing of 5 loads per acre ordinary manure was given. The field receives the wash from higher levels. The crop suffered from deficient late rainfall, and the outturn of grain is comparatively poor. The weight of straw per acre is heavy, an indication that the crop promised early in the season to yield bountifully. The field bears an assessment of Rs. 2-12-2 per acre. The outturn 360 lbs. of grain and 4,100 lbs. straw are together valued at Rs. 22-0-6 per acre. The grain is priced at 28 $\frac{2}{5}$ lbs. and the straw at 4 cwts. per rupee. These are easy rates as compared with those which prevailed later in the season. The sample of grain forwarded to my office moulded during transit, and was in far too damp a condition for safe storage. If the bulk was measured or weighed in the same condition, a liberal deduction should be allowed for dryage. The crop is estimated at 4 annas.

Mr. Lushington's second rice experiment (No. 40) was taken on black-soil field which is favourably situated. It receives the wash from higher levels, also gets water from an adjoining spring. Consequently the want of late rain had no serious effect on the crop. Rice is always grown in this field, but no second crop is taken. Six loads ordinary manure were given per acre. The seed was drilled late in May. The crop yielded 2,142 lbs. grain and 3,520 lbs. straw per acre together worth Rs. 91-14-0. The crop was estimated at 8 annas by the cultivator and 12 annas by Mr. Lushington. The outturn indicates at least a full average crop of drilled rice. Prices both for grain and straw are of course higher than usual. The incidence of assessment is only 3.68 per cent. I do not think that the field tested was a good selection. The season owing to scant late rainfall was admittedly a poor one for rice. The crop was not much affected by the character of the season for reasons already referred, and was, I feel certain, much above the average of drilled rice in the district.

This officer's *nāgli* test (No. 41) shows the disastrous effect of the season on poor upland sloping land. The field, which has sandy soil assessed at 6 annas per acre, is periodically fallowed or allowed to lie waste. *Kulthi* was taken before the *nāgli* and the occupant intended to take *sáva* and then niger seed before allowing the land to again lie waste. The field had an application of 2 $\frac{1}{2}$ loads per acre ordinary manure before sowing. There was no very early rain; then in June the rain was so heavy that sowing was interrupted. The crop was sown by drill in July. The seed-rate reported, *viz.*, 27 lbs. per acre, is much over-estimated. It is about one-third the outturn. The late rains were so scant that the crop dried up, and a 2-anna outturn was the result. The produce, 85 lbs. grain and 1,350 lbs. straw per acre, is valued at Rs. 5-14-8. The incidence of assessment is 6.34 per cent. The experimenter says that the river bank crops of *nāgli* were fair, but those on upland land were very bad.

Bija'pur.

No crop experiments were made by any of the officers in this district on account of the absence of a crop fit for the purpose owing to utter failure of the last monsoon.

Dha'rwa'r.

Four experiments have been reported from this district. Of these two are by Mr. Anderson and one each by Messrs. Roper and Bhángáonkar. No further experiments were carried out under the permission granted by Government Resolution No. 9672, dated 2nd December 1896, Revenue Department.

Mr. F. G. H. Anderson, Assistant Collector,

Submits two experiments (Nos. 42 and 43) on *jowári*, one on good black soil, the other on medium red soil. The fields are respectively assessed at Rs. 1-12-4 and Re. 0-3-10 per acre. The black-soil field grows cotton and *jowári* in alternate years, the cereal having invariably subordinate rows of pulse, &c. The rotation in the second field is rather indefinite. The tested crop had subordinate rows of pulses. *Sáva* was grown in the field in 1893, hot weather *jowári* in 1894 and chillies in 1895. This field had a very light dressing of manure this year, 5 or 6 loads to 12½ acres. The black-soil field, on the other hand, had a fair dressing of 8 loads per acre. The early rain was overabundant and is reported to have damaged the crop in the light-soil field. The soil became water-logged and the crop was sparsely planted. No rain fell between August and harvest time. The black-soil field resisted the drought to a remarkable extent and when ripe the crop was full average. At this stage the rain lodged the crop, the ears sprouted, and considerable damage was done. This field was recently cleared. The cost is reported to have been Rs. 75 per acre. This is probably much over-estimated.

The light-soil field suffered from the drought late in the season, but as the crop took 4½ months to reach maturity the poor outturn is probably attributable to a thin crop rather than to scant late rainfall. The seed-rates, 3½ lbs. in the black-soil field and 4½ lbs. in the other, are under average. The subordinate crops were not tested and the outturn figures are calculated on the supposition that the test areas were fully occupied by the crops experimented upon.

The black-soil field yielded 1,048 lbs. of good grain, 130 lbs. damaged grain, and 10½ head-loads of *kadbi* together worth Rs. 38-3-2 per acre. The incidence of assessment works out to 4·63 per cent. The light-soil field produced 157 lbs. grain and 1½ head-loads of *kadbi* together worth Rs. 5-7-0 per acre. The incidence of assessment is 10·15 per cent., which is a very moderate figure for an abnormally poor crop estimated at 3 to 4 annas. The produce is valued in both experiments at rates considerably cheaper than those which subsequently prevailed.

Mr. C. R. Roper, Assistant Collector,

Submits a rice test (No. 44) which is not satisfactory. The sample received in my office weighed 8 *tolas* less than the recorded weight, and on this account the outturn as reported ought probably to be reduced by about 7 per cent. The experimenter reports that the field selected was over average for the district, the crop being estimated at 12 annas, whilst the average of such crops in the neighbourhood was 6 to 8 annas. An average crop for the district ought to have been selected.

The rice was grown on hard reddish soil which bears an assessment of Rs. 5-3-8 per acre. The field gets water from a tank. The extent of irrigation is not reported. No manure was given to the rice land during the last three years. In 1892-93, 7½ loads per acre were given. The crop was raised from drilled seed; 85½ lbs. per acre drilled in May produced in six months 3,048 lbs. grain and 3,934 lbs. straw. This would be considered a first-rate outturn for transplanted rice. I fear there are circumstances connected with the cultivation of the field which the report does not disclose. Hard red soil unmanured for three years and growing rice every year could hardly have produced such a good crop unless the field benefits by sullage or is otherwise favourably placed.

Mr. K. N. Bhángáonkar, District Deputy Collector,

Reports one test (No. 45) on sesamum. The field has black soil, assessed at Rs. 1-11-7 per acre. The field grows cotton alternately with either *jowári*, gram, linseed or sesamum. It was manured in May with about 4 loads ordinary manure

per acre and subsequently harrowed. The seed, about 23 *tolas* per acre, which is perhaps slightly under average, was drilled in July. The rain for kharif crops was scanty and unseasonable. The outturn comes to 179 lbs. oilseed and 356 lbs. by-product per acre, the latter being only useful as fuel. The gross produce is estimated to be worth Rs. 9-13-4 per acre. The incidence comes to 17·53 per cent., which is not high, considering the unfavourable nature of the season.

Kola'ba.

Only one officer Mr. Brooke reports two experiments from this district. One of these, however, was taken on salt land, which yielded no grain. It has therefore been omitted from the tabular statement of results. No further experiments were undertaken on the authority of Government Resolution No. 9672, dated 2nd December 1896, Revenue Department.

When Survey Officers joined the district, there were no crops standing in Mángaon and Mahád talukas, where their operations were being conducted, and consequently no experiments were taken by them.

* *Mr. H. O. W. G. Brooke, Assistant Collector,*

Reports two rice experiments. The weight of the sample measure *ser* of grain, in connection with the first test sent to my office, was found to be $47\frac{1}{2}$ *tolas*, whereas the calculations are based upon a weight of $55\frac{1}{4}$ *tolas* per *ser*. This throws doubt on the experimenter's figures.

The first test (No. 46) was taken on mixed red and black soil of sandy character. The field lies between salt rice fields and higher ground. It has a natural water-course along one side, and the experimenter reports that it could easily be brought under artificial irrigation by well or water-course, and with such assistance the crop experimented upon would have been 14 or 16 annas this year instead of 4 annas. The field, almost exactly one acre, was rābed with 4 loads cowdung, branch loppings and grass before sowing. About 68 lbs. seed was sown per acre; but it is not clear whether the crop was drilled or broadcasted. Sowing was completed early in June with the first monsoon showers, and after three ploughings. The drainage from higher levels is usually beneficial, but during the heavy downpours in July the field was flooded to an excessive extent. More serious damage was done by the drought which prevailed during the last three months of growth. The crop is estimated at 4 annas for the whole field, count being taken of the flooded and withered patches. The outturn, *viz.* 715 lbs. grain and 1,300 lbs. straw, is valued at Rs. 24-2-8 per acre, the market rates being 30 to 35 per cent. higher than usual. The field bears an assessment of Rs. 7-12-9. If the irrigation facilities, which exist, were fully taken advantage of, it is clear that transplanted rice could be grown. The incidence comes to 32·26 per cent. Second crops of *vāl*, &c., are usually taken. The owner is a Mār wādi. He usually gets 17 maunds of rice as rent and the outturn in an average year is reported to be 30 maunds or more. The experimenter says the field is a favourable example of the year's outturn on low-lying lands in the neighbourhood.

This officer's second test was taken on salt sandy soil growing rice every year. Two carts rāb material were used on 30 gunthas. The first seedlings were destroyed by flood water. The plants from second sown seed withered during the prolonged drought. The grain shrivelled in the ear, and there was no produce but straw. The experiment has, for obvious reasons, not been reported in the tabular statement. The experimenter says that the test affords evidence of the state of the harvest in salt rice lands along the borders of the Amba Creek. The field was no better and no worse than many others in salt rice villages. The *makta* in ordinary years is 8 maunds on about 30 gunthas of cropped land.

Ratna'giri.

Each officer was asked to take four experiments, one on *rāgi*, one on *harik* and two on sesamum. The last crop was harvested long before the commencement of the camping season. So Mr. Chuckerbutty carried out two tests on *nāgli* and one each on *kodra* and nigerseed. Mr. Swifte took one test on *nāgli* and three on *harik*, and Mr. Kelkar two on *nāgli* and one on *harik*.

Mr. A. W. G. Chuckerbutty, Assistant Collector,

Reports four experiments : two on *nágli* and one each on nigerseed and *harik*.

The nigerseed tested (No. 47) was an extremely poor crop grown on sloping gravelly *bharad varkas* land assessed at Re. 0-4-4 per acre. The season was bad and outturn results in consequence poor. The field was not well cultivated. The crop was not weeded or otherwise attended to after the seed was sown. The field, after three years' fallow, has grown *nágli* in 1894, *harik* in 1895, and the crop experimented upon this year, which is the last crop of the rotation. The outturn is only 25 lbs. seed and 200 lbs. stalks per acre together worth Rs. 1-10-0. The incidence of assessment works out to 16.66 per cent.

This officer's first test on *nágli* (No. 48) was taken on land of a better sort and more favourably situated. The land is of fair depth and is flat. It is in a low-lying situation and soaks up rain as it falls, but does not retain sufficient water to be suitable for rice. The field was fallow for 10 years prior to 1893. *Vari* and *harik* were grown in 1894 and 1895. The field will relapse again to waste in the current season. The crop was carefully tilled and well manured and was grown from transplanted seedlings raised on a rábed seed-bed. Dried fish was used as manure, 14½ maunds being applied per acre. A piece of fish was placed in each of the holes prepared for the seedlings before transplantation. The seed-rate, 14 lbs. per acre, is much higher than was necessary. The tillage was particularly careful and the crop yielded 721 lbs. of grain and 138 lbs. chaff or useful by-product per acre together worth Rs. 29-13-11. Apparently the value of the straw is neglected. It has little value as fodder. The grain is valued at 25 lbs. per rupee although prices had not risen to this pitch until some time after the date of experiment. The value of the crop, though the yield is small, is perhaps not much under average. The incidence of assessment is very low even when count is taken of the years of fallow.

Another *nágli* test (No. 49) was taken by the officer in another Phálni number of the same survey number. The test area was only 2 gunthas. This is against standing orders. The land bears exactly the same assessment as that of the first *nágli* test; but it is brought under cultivation only occasionally. The experimenter reports that the land was fallow from 1885 to 1895 and would again be allowed to lie waste after the 1896 crop for another term of ten years. I doubt the accuracy of the statement. The cultivator would hardly go to the expense of breaking up land for a single crop. The crop was grown from transplanted seedlings raised in a rábed seed-bed. No manure was applied directly to the field, nor is it likely that it was required. The seed-rate, 18 lbs. per acre, is two or three times as much as was necessary. The outturn was 260 lbs. grain and 122 lbs. useful by-product together worth Rs. 11-15-10. The grain is again valued at a higher rate than that current at the time.

Mr. Chuckerbutty in his last test (No. 50) on *harik* again chose a 2 guntha test area. The land is sloping *varakas* assessed at Re. 0-5-1 per acre, but is not steep; therefore there is not much surface wash and erosion of soil during heavy rainfall. The field was fallow from 1884 to 1893. In 1894 the crop was *kulthi*, in 1895 *nágli*; then the tested *kodra* crop, in 1896, and the cultivator intends to grow nigerseed and *sarvat* rice in 1897 and 1898, and then a fallow of five years will be allowed. The seed, 17 lbs. per acre, was broadcasted in June and the crop ripened in November. Meantime it got no attention except a trifling amount of weeding, and the cultivation is described as indifferent. The outturn is only 98 lbs. grain and 835 lbs. straw per acre worth Rs. 1-9-7, a miserably poor crop in a bad season. Consequently the incidence of assessment, 19.87 per cent., is high.

Mr. L. C. Swifte, Assistant Collector,

Reports one test on *nágli* and three on *harik*. In two of the experiments the test areas are much below the prescribed minimum. Mr. Swifte explains that these coarse hill millets ordinarily occupy small scattered areas with uncultivated waste between the plots. Moreover, owing to the scantiness of the late rainfall, nearly all the crops ripened prematurely and harvest was general before the camping season. Owing to the early harvest there was a very limited choice

for selection. The first two tests were taken on the same day, 22nd October, the last two a month later. Meantime prices had risen to a high pitch. In the experiments taken in October, *nágli* is valued at 34 lbs. per rupee and *harik* at 47½ lbs. per rupee. These prices are considerably above normal rates; but are much cheaper than the rates prevailing in November, viz., 30½ lbs. per rupee for *harik*. This is the most inferior millet cultivated, and the grain is only eaten by low castes and the very poorest people.

Although the experiments show that the outturn in each of the experiments is much under average, if the produce was held by the cultivators until prices had risen to the highest pitch, the gross values of the crops would not be much less than average, and if, as is reported, the tests were taken on crops which for the year were under average for the respective villages, then the average cultivator, if he had surplus grain to sell, was possibly as well off as in a fairly good year. It is, however, probable that in the majority of cases all or nearly all the produce was required for home consumption.

Mr. Swifte's *nágli* test (No. 51) was taken on *bharad varkas* land which grows the following sequence of crops after five years' fallow :—(1) *nágli*, (2) *harik*, (3) *vari*, and (4) niger seed. The reported seed-rate, 11 lbs. per acre, is considerably over average. The crop was grown as usual from transplanted seedlings raised in seed-bed which was raked with cowdung, branch loppings, and grass. The seedlings were transplanted in July, the crop ripened in October and yielded 454 lbs. grain and 1,440 lbs. straw per acre. At the rates then prevailing, the gross value of produce comes to Rs. 15-13-4 per acre. A month later the crop would have been worth a good deal more. The incidence comes to 1.25 per cent. In judging of the incidence of course count should be taken of the period of fallow. The land then has a grazing value, but there is no marketable produce. *Nágli* is the most expensive crop to grow and is also the most productive and valuable of the crops taken during the period of rotation. This should also be considered in judging of the fairness of the incidence.

The three tests (Nos. 52—54) taken on *harik* will bear useful comparison. The first crop was grown on poor thin upland soil from which owing to its steep aspect seed and seedlings were in part washed away by the heavy early rains. The failure of the late rains was of course particularly disastrous for such land. The field of the second crop was fairly level and in a lower situation and in consequence was supposed to have retained more moisture than the upland slopes, but the outturn does not indicate any particular advantage of this sort. This as well as the crop of the last test ripened in November. The seed was sown in June and it is surprising that the crops did not wither much earlier. The last crop occupied thin rocky sloping land situated high on a hill. The soil retained more moisture than adjoining lands of similar class, but for what reason is not clear. The outturn is considerably better than in the other tests.

In the *harik* experiments the rotation is nearly the same; in all four years of cropping are followed by four years of fallow. *Nágli*, *harik*, *vari* and niger seed were grown in the first two fields, *nágli*, *harik*, niger seed and *sarvat* rice in the third. The reported seed rates were higher than usual in all the fields.

Outturn, &c., results were as under :—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		Principal Product.	By-product.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
First field (Exp. No. 52).	5	301	1,611	6 10 7	0 2 8	2.50
Second field (Exp. No. 53).	5	351	18 bundles.	12 10 4	0 2 7	1.27
Third field (Exp. No. 54).	11	585	36 do.	21 7 2	0 3 0	0.87

Mr. V. R. Kelkar, District Deputy Collector,

Reports three careful tests, two on *nágli* and one on *harik*. The first *nágli* experiment (No. 55) was taken on *mál varkas* land, which bears an assessment of 6

annas per acre. The crop of experiment was the first taken after a five years' fallow; it appeared to have been not quite even. Therefore three test areas in different parts of the number were chosen to give a fair average for the whole. The same course was adopted in the other experiments by this officer. The *ndgli* will probably be followed by *vari*, *harik*, *sarvat* rice and niger seed, and then the field will be rested for five years. The sequence of crops in the rotation indicates that the land is good *varkas*. The *ndgli* was grown from rābed seedlings transplanted in the usual way with fish as manure. The application of dried fish was 20 maunds per acre. The season was favourable early, but the total absence of rain later diminished the outturn considerably. The cultivation is described as good. The reported seed-rate is 10 lbs. per acre, a quantity sufficient to supply seedlings and allow liberally for damages by flood water and other mishaps. The crop, locally estimated at 11 annas, yielded 680 lbs. grain and 1,062 lbs. straw per acre, the gross value of which comes to Rs. 24-1-10. The grain is valued, however, as in the other experiments by this officer at a comparatively cheap rate. Much higher rates prevailed later in the season. The incidence of assessment, 1.55 per cent., is very light.

The second *ndgli* crop (No. 56) tested by this officer did not yield so well. The field grows various crops in different portions. The portion occupied by *ndgli* was fallow in the previous year. It is intended to take *sarvat* rice next year and then niger seed in the following year and the field will be fallow for four years afterwards. Season and cultivation were the same as in the first field excepting that the seed-rate, $7\frac{1}{2}$ lbs. per acre, was less and no manure was given. An outturn of 431 lbs. grain and 846 lbs. straw worth together Rs. 13-15-5 classed the crop, according to local opinion, as an 11-anna one.

Mr. Kelkar tested *harik* (No. 57) on *māl varkas* land which after four years' fallow grows *ndgli*, *harik* and niger seed. Season was similar to that in the other tests. Seed-rate, 31 lbs. per acre, is high. Cultivation is described as good but no manure was applied. Outturn per acre came to 470 lbs. grain worth Rs. 8-4-11. This is called a 10-anna crop. Incidence works out 4.01 per cent.

Ka'nara.

Rice, sugarcane and *rāgi* were the crops selected for this year's experiments. Messrs. Deshmukh and Benegiri did between them the three experiments required of their charge. Mr. Keatinge did only one test on rice. His charge was heavy and later on he was absent with a survey party.

Mr. L. G. Deshmukh, Assistant Collector.

Mr. Deshmukh's first test (No. 58) was taken on *Vaingan* rice grown on sandy soil which had grown monsoon rice during the kharif season. The field was forfeited to Government owing to failure to pay assessment in 1893. In 1894 it lay waste. In 1895 it was cultivated with hot weather rice and in the current season both early and late rice have been grown thereon. Green leaves and loppings of young branches of trees were scattered in the cattle shed and allowed to be trampled under cattle feet for about 8 days. The manure as it accumulated was removed from time to time and stored in a pit. About 125 head-loads per acre were spread over the field before the sowing of the *Vaingan* rice. Late rains had been altogether absent since middle of August. The field was irrigated from a tank for $2\frac{1}{2}$ months (November to January 15) every second day. The water, if rains are copious, runs up to end of January. This year owing to deficiency of late rains, the channel water ceased flowing up a fortnight earlier. About 118 lbs. of seed sown at end of October gave in middle of March 704 lbs. grain and 1,695 lbs. straw, together worth Rs. 24-8-1. The experimenter observes that in richer soils with copious irrigation, the average crop is twice as good as in this experiment. The incidence comes to 15.49 which, considering that it is on the second crop alone, is certainly far from high.

The sugarcane test (No. 59) reported by Mr. Deshmukh gave very poor results. The crop was raised on yellowish clayey soil mixed with a large proportion of sand. It grows rice for two years followed by sugarcane in the third. The land was ploughed up and then grass, leaves and branches were spread thereon and burnt. Sets were then planted in rows after irrigating the land with well water. The seedlings in each row stood $\frac{1}{2}$ foot apart and the distance

between two rows was 2 feet. One month after sowing, burnt earth was put round the young shoots when they were about a foot high. Manure was similarly applied two months later and covered with earth. About 1,000 head-loads consisting of compost of green leaves and cattle-shed manure sufficed for an acre. The season was very unfavourable. Rain was excessive early in the season and the crop stood 5 feet under water for 15 days. No rain fell after middle of August and consequently the crop suffered considerably. Well water was available for irrigation and the crop is reported to have been so watered for two months after plantation every second day; but probably the irrigation was less frequent. Why the crop was not irrigated after failure of rains, is not explained. The crop was planted in March and produced in 12 months 1,830 lbs. of liquid jaggery and 14,820 tops, useful for planting, worth together Rs. 137-1-11 per acre. The outturn of the principal product compares very unfavourably with Mr. Hudson's test on similar crop in 1891-92 (No. 72 of the report). Then the outturn came to 9,233 lbs. liquid jaggery and 21,000 seed tops. The seed tops in the present test have been valued at Rs. 59-4-0 per acre, in the previous test at Rs. 85, the same rate Rs. 4 per 1,000 being taken in both cases. The dry leaves have not been valued, as they were left on the land and burnt as rāb material.

Mr. G. H. Keatinge, Assistant Collector,

Submits a test (No. 60) on broadcasted rice. The crop yielded well and I think is under-estimated at 10 annas. The experimenter says: "Looking to the character of the season, the field chosen for the experiment was the best in the locality." It would have been better to have selected an average field so as to show the effect of an abnormally poor season on the outturn. The field grows rice every year, but no second crop; it is assessed at Rs. 4-13-0 per acre. The soil is sandy and dark-brown. A light dressing of cowdung and leaves composted together in a pit was given in May before sowing, the application being 20 basketfuls or about 2,400 lbs. per acre. The seed, 142 lbs. per acre, was broadcasted in June. The crop ripened early in October. Excessive rain early in the season and total failure at the end of the season are reported to have caused damage, but the yield 2,012 lbs. of grain and 1,841 lbs. straw per acre is very satisfactory. The gross value of outturn is Rs. 42-7-2 per acre and the incidence of assessment 11·33 per cent.

Mr. R. P. Benegiri, District Deputy Collector.

The rice crop experimented upon (No. 61) by Mr. Benegiri was grown on sandy soil, *hoinge mannu*, with retentive subsoil growing the same crop every year, but no second crop. The field received about 300 head-loads of compost of cowdung, paddy husk and dry leaves before sowing. It was ploughed five times before being manured and twice afterwards. The rain held off at the commencement. In July and August it was very excessive and after that there was no rain at all. In July the field was swamped with water, which interfered with the growth; otherwise a better crop would have been produced. The seed was broadcasted in the middle of May and in less than 5 months produced 2,096 lbs. grain and 2,927 lbs. straw together worth Rs. 45-4-0 per acre. The grain was valued at 53½ lbs. per rupee and the straw at Rs. 6-4-0 per acre. Much higher prices for grain prevailed later on in the season. The field was selected as representing an average crop in the vicinity. The assessment is Rs. 4-8-2 and the incidence only 9·96 per cent.

J. MOLLISON,

Deputy Director of Agriculture, Bombay.

Poona, 5th August 1897.

TABULAR SUMMARIES.

Summary of Crop Experiment Reports,

O. S. = Original Survey;

No.	District, Táluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formulæ.	AVERAGE PER ACRE.					
					Seed.	Yield of		Total Value of Produce.	Assessment, excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.
						Principal Product.	By-Product.			
1	2	3	4	5	6	7	8	9	10	11
	AHMADABAD.		Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.
	<i>Mr. L. Robertson, Assistant Collector.</i>									
1	Daskroi (Rájpar Karipar)	Spiked millet (Bájri) 3rd October 1896.	13	790	8	323	...	29 2 9	8 15 0 R. S.	30.64
2	Do. (Báreja) ...	Rice (Sutar sál) 30th October 1896.	16	2,100	5	2,154 in husk.	...	69 6 0	2 0 4 R. S.	2.98
3	Do. (do.) ...	Do. 31st October 1896.	9	1,180	5	974 Do.	...	31 9 0	6 3 3 R. S.	19.65
	<i>Mr. P. J. Mead, Assistant Collector.</i>									
4	Sánand (Bodakdev) ...	Great millet (Juvár), 22nd October 1896.	10 to 12	720 to 870	61½	186	2,776	20 0 4	2 9 11 R. S.	13.08
5	Dholka (Kocharia) ...	Rice (Kamod), 1st December 1896.	12	1,460	15½	2,256 in husk.	3,692	85 0 0	5 10 2 R. S.	6.63
	<i>Mr. H. F. Carvalho, District Deputy Collector.</i>									
6	Viramgám (Hásalpursar-reshar).	Great millet (Juvár), 5th November 1896.	8	580	18	110	2,633	13 5 1	1 2 3 R. S.	8.56
7	Dhandhuka (Dhandhuka)	Wheat, 11th February 1897.	12	675	51	520	322	32 15 5	3 10 7 R. S.	11.10
8	Do. (Bhadiád) ...	Do. 21st February 1897.	12	675	41	540	269	27 9 10	1 15 4 R. S.	7.09
	KAIRA.									
	<i>Mr. F. X. D'Souza, Assistant Collector.</i>									
9	Mehmadabad (Kaira) ...	Spiked millet (Bájri), 8th October 1896.	13	710	18	615	4,308	45 12 6	5 4 11 R. S.	11.59
10	Do. (do.) ...	Do. do. 9th October 1896.	3	170	18	108	725	6 11 3	4 13 10 R. S.	72.57
11	Do. (do.) ...	Paspalum scrobiculatum (Kodra), 8th October 1896.	13	975	19½	959	2,051	27 13 9	4 7 1 R. S.	15.94
12	Do. (do.) ...	Do. do. ... 10th October 1896.	3	225	18	333	500	8 7 0	4 3 10 R. S.	50.24

Northern Division, 1896-97.

R. S.—Revision Survey.

Area of Test.	Equivalent in Tolas of local measure Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
		Principal Product.	By-Product.	
12	13	14	15	16
A. g.	Tolas.	Lbs.	Cwts.	
0 8	40 (weight.)	27 $\frac{2}{3}$	...	<i>Experiment No. 1.</i> — <i>Bajri</i> with pulses on highly assessed <i>goradu</i> soil growing the same crop every year. Portion of the field manured every year turn by turn. Season fair and tillage good. The grain yield represents a 5-anna crop of the formulæ. By-product not weighed but valued very high at Rs. 17-8-0 per acre. Subordinate pulses not tested but valued at Rs. 6 per acre. The latter amount not included in column 9
0 4	Do.	32 $\frac{4}{5}$	...	<i>Experiment No. 2.</i> — <i>Sutarsal</i> rice on <i>kiari</i> land. The field was broken up for cultivation only last year and converted into <i>kiari</i> in the current season. Late rains absent and prevented proper filling of the grain. Tillage good. Outturn full average. By-product not weighed but valued at Rs. 3-12 per acre. Seed-rate very low.
0 4	Do.	32 $\frac{4}{5}$	...	<i>Experiment No. 3.</i> —Rice, <i>Sutarsal</i> , on good <i>kiari</i> land growing the same crop every year apparently without any manure. Season unfavourable as above. Tillage good. Seed-rate very low. Yield 7 annas according to the formulæ standard. By-product valued at Rs. 1-14 per acre.
0 8	Do.	23 $\frac{2}{3}$	1 $\frac{13}{14}$	<i>Experiment No. 4.</i> — <i>Juvár</i> on dry-crop <i>goradu</i> soil growing <i>juvâr</i> and <i>bajri</i> in indefinite rotation. Thirty carts of cattle-dung used per acre before sowing. Cultivation good, but owing to failure of late rains, the yield of grain came to only 2 annas. Grain very light and thin. By-product weighed when not dry and is valued at about Rs. 12 per acre.
0 4	Do.	27 $\frac{1}{3}$	8	<i>Experiment No. 5.</i> — <i>Kamod</i> rice on rich <i>goradu</i> soil growing the same crop every year. Field manured with 24 carts of ordinary manure per acre and irrigated 4 times from a pond by means of a <i>jheel</i> . Half a <i>bigha</i> of seed-bed supplied seedlings to plant an acre. The outturn of grain represents an 18-anna crop of the formulæ. Season very fair and tillage good.
0 8	Do.	24	2 $\frac{5}{7}$	<i>Experiment No. 6.</i> — <i>Juvâr</i> on dry-crop black soil without any manure. During the past three years the crops grown were :—(1) wheat, (2) wheat, (3) cotton. Season unfavourable owing to absence of late rains and part of the field submerged owing to excessive July rains. Cultivation good. Grain yield 2 annas according to formulæ. <i>Kadbi</i> worth Rs. 8-11-9 per acre.
0 8	Do.	16 $\frac{2}{5}$	2 $\frac{1}{5}$	<i>Experiment No. 7.</i> —Unmanured wheat on <i>jirayat</i> black soil. The field grows wheat and cotton in alternate years. The crop suffered owing to absence of late rains, though it was benefited to some extent by rain at end of November. Tillage good. Grain valued high owing to rise in prices on account of scarcity prevailing in other parts of the Presidency.
0 8	Do.	20 $\frac{1}{2}$	1 $\frac{13}{14}$	<i>Experiment No. 8.</i> —Do. do. do. Grain inferior to that in the above test and valued at a cheaper rate.
0 8	Do.	21 $\frac{1}{5}$	2 $\frac{1}{2}$	<i>Experiment No. 9.</i> — <i>Bajri</i> with <i>math</i> on <i>jirayat</i> land growing the same crop with pulses, <i>kodra</i> , sesamum, &c., and also tobacco on part of the field. Land manured with 22 cart-loads of ordinary manure per acre. Season unfavourable owing to early cessation of rains. The subordinate crop failed entirely. Tillage good.
0 8	Do.	22 $\frac{6}{7}$	3 $\frac{1}{4}$	<i>Experiment No. 10.</i> —Same crop on similar but slightly lower assessed soil growing <i>bajri</i> and pulses alternately with <i>juvâr</i> and pulses. Land manured with 11 carts per acre of farm-yard manure. Season, &c. as above. Tillage good. Subordinate pulses were not ripe at time of experiment and so left untested. Incidence high owing to unfavourable outturn and exclusion of subordinate pulses.
0 8	Do.	36 $\frac{1}{2}$	4 $\frac{4}{7}$	<i>Experiment No. 11.</i> — <i>Kodra</i> on good <i>jirayat</i> land growing the same crop for the past 2 years, preceded by <i>juvâr</i> and <i>bajri</i> . No manure used. Season as above. Tillage good. Outturn 12 annas of the formulæ.
0 8	Do.	41	14 $\frac{1}{2}$	<i>Experiment No. 12.</i> —Same crop with <i>tuver</i> on similar soil growing the same crop with or without pulses. Other conditions as above. Outturn exclusive of <i>tuver</i> , which was not ripe at time of experiment and represents a 4-anna crop of the formulæ. Incidence high.

Summary of Crop Experiment Reports,

O. S.=Original Survey;

No.	District, Taluka, Village and Experiment.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formula.	AVERAGE PER ACRE.					
					Seed.	Yield of		Total Value of Produce.	Assessment, excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.
						Principal Product.	By-Product.			
1	2	3	4	5	6	7	8	9	10	11
	KAIRA—continued. <i>Mr. B. E. Modi, District Deputy Collector.</i>		Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.
13	Matar (Ratanpur) ...	Spiked millet (Bajri), 10th October 1896.	5	300	8	97	513	8 9 1	5 6 0 R. S.	62.73
14	Do. (Nayka) ...	Rice (Jhini sal), 12th November 1896.	20	3,000	11 $\frac{2}{3}$	2,658 in husk.	2,338	93 10 0	9 9 7 R. S.	10.25
15	Matar (Asamli) ... <i>Mr. Jivanlal Pranjiwandas, District Deputy Collector.</i>	Gram, 4th February 1897.	18	790	66	390	372	16 8 6	3 9 2 R. S.	21.61
16	Matar (Vansor) ...	Spiked millet (Bajri), 8th October 1896.	4	240	9 $\frac{1}{4}$	77	436	5 0 0	4 12 9 R. S.	95.93
17	Do. (do.) ...	Paspalum scrobiculatum (Kodra), 8th October 1896.	16	1,350	9 $\frac{1}{4}$	1,026	1,641	21 9 0	5 11 5 R. S.	26.49
	PANCH MAHALS. <i>Mr. J. A. G. Wales, Assistant Collector.</i>									
18	Godhra (Dayal) ...	Do. do. 24th October 1896.	4	320	82	864	2,112	16 13 5	0 11 1 O. S.	4.11
19	Do. (Godhra) ...	Spiked millet (Bajri), 29th October 1896.	8	410	23 $\frac{1}{2}$	449	2,525	34 8 11	0 15 4 O. S.	2.77
20	Do. (Ambala) ... <i>Mr. B. R. Heblikar, District Deputy Collector.</i>	Do. do. 3rd November 1896.	12	620	14	385	2,231	31 9 4	1 0 11 O. S.	3.34
21	Dohad (Dalsar) ...	Gram (Rata Chana), 6th March 1897.	8	490	82	402	394	17 12 0	2 4 0 R. S.	12.67
22	Do. (Ukardi) ...	Do. (Pila Chana), 8th March 1897.	8	490	82	361	382	15 15 9	2 10 1 R. S.	16.45
	BROACH. <i>Mr. H. L. Painter, Assistant Collector.</i>									
23	Ankleshvar (Sisodra) ...	Cotton (Deshi), 22nd February to 22nd March 1897.	14	390	7 $\frac{1}{2}$	314 seed cotton.	5 cart loads.	23 4 5	5 1 1 O. S.	21.77
24	Do. (Divi) ... <i>Mr. Phirozshah Pestonji, District Deputy Collector.</i>	Great millet (Shialu Juvár), 29th March 1897.	16	1,050	31	1,436	1,040 kadbi 390 chaff.	81 15 5	5 7 9 O. S.	6.69
25	Ankleshvar (Umarvada) ...	Rice (Sukhvel), 3rd December 1896.	16	1,500	86	1,613 in husk.	2,370	79 10 8	9 10 1 O. S.	12.08

Northern Division, 1896-97—continued.

R. S.=Revision Survey.

Area of Test.	Equivalent in Tolas of local measure Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
		Principal Product.	By Product.	
12	13	14	15	16
A. g.	Tolas.	Lbs.	Cwts.	
0 8	40 (weight)	24 $\frac{1}{2}$	1	<i>Experiment No. 13.</i> — <i>Bājri</i> on rich <i>gorādu</i> soil growing the same crop with the usual pulse mixtures every year. Field lightly dressed with about 3 carts per acre of cowdung. The crop suffered greatly owing to absence of late rains, and the grain yield amounts to only 1 auna outturn of the formulæ. Subordinate pulses not tested but are estimated to have yielded 30 lbs. of grain. Their value not included in column 9. Incidence high and due to causes explained.
0 5	Do.	28 $\frac{1}{2}$	8 $\frac{3}{4}$	<i>Experiment No. 14.</i> — <i>Jhini Sāl</i> rice on <i>besar kiari</i> land growing the same crop every year. Seed-bed manured with 20 carts of ordinary manure per acre but not the field. The crop irrigated, when late rains failed, twice in September from the Khāri Cut. Four gunthas of seed-bed sufficed for an acre of field. Sprouted seed sown in the seed-bed. The outturn represents an 18-anna crop of the formulæ. Season favourable and tillage good.
0 10	Do.	24 $\frac{1}{2}$	8 $\frac{3}{8}$	<i>Experiment No. 15.</i> —Gram on unmanured <i>besar</i> soil that grew wheat in the previous year and wheat on half the field and nothing on the other half during the year preceding. Gram sown this year as moisture was insufficient for wheat. Season unfavourable owing to lack of late rains. November rain, however, beneficial. Tillage good; seed-rate very high. The pulse outturn 9 annas according to the formulæ.
0 8	Do.	24 $\frac{1}{2}$	2 $\frac{1}{14}$	<i>Experiment No. 16.</i> —Unmanured <i>bājri</i> on good <i>gorādu</i> dry-crop soil growing the same crop with pulse mixtures every year. Season very unfavourable owing to absence of late rains. Outturn scarcely a one-anna crop of the formulæ. Pulses, subordinate to <i>bājri</i> , not tested. Incidence very high for causes mentioned.
0 8	Do.	48 $\frac{3}{4}$	31 $\frac{1}{4}$	<i>Experiment No. 17.</i> — <i>Kodra</i> on good <i>gorādu</i> soil. The field grew the same crop with pulses last year and wheat in the two preceding years. The crop suffered owing to absence of late rains. But tillage was good and a 12-anna crop was secured.
0 8	Do.	51 $\frac{1}{2}$	...	<i>Experiment No. 18.</i> —Same crop on similar soil which grew the same crop with <i>ban'i</i> in the previous year and lay waste for two previous years. Season bad owing to absence of late rains. Seed-rate very high. Tillage not good. Outturn 11 annas according to the formulæ. By-product not useful and not valued.
0 8	Do.	23 $\frac{3}{5}$	1 $\frac{3}{7}$	<i>Experiment No. 19.</i> — <i>Bājri</i> with pulses on similar but more highly assessed land growing the same crop every year. Field manured with about 13 $\frac{1}{2}$ carts of cattle manure per acre. Season unfavourable as above. Tillage fair. Seed-rate high. By-product valued very high at Rs. 15-8-7 per acre.
0 8	Do.	21 $\frac{1}{2}$	1 $\frac{3}{8}$	<i>Experiment No. 20.</i> —Same crop on similar soil. Field lightly dressed with 3 carts of cattle-dung per acre. Season, &c., as above. Outturn of grain 7 annas according to the formulæ.
0 10	Do.	23 $\frac{2}{5}$	5 $\frac{6}{7}$	<i>Experiment No. 21.</i> —Red gram grown as a second crop on light-brown <i>gorādu</i> soil growing maize followed by wheat, barley, or gram every year. Field manured with 2 carts per acre for the first crop. Season not favourable and tillage indifferent. Seed-rate high. Incidence on the second crop only.
0 10	Do.	23 $\frac{2}{5}$	5 $\frac{5}{6}$	<i>Experiment No. 22.</i> —Yellow gram on similar land. Other remarks as above.
0 8	Do.	12 $\frac{4}{5}$	8 cart-loads.	<i>Experiment No. 23.</i> — <i>Deshi</i> cotton on <i>jirāyat</i> black soil which grew wheat in the previous year and lay fallow in the year preceding. Field manured by sheep and goat folding and also with 30 carts per acre of cattle-dung. Season unfavourable owing to absence of late rains. Tillage good. Cotton picked only twice. First picking tested by Mr. Phirozshāh, the second by Mr. Painter. Crop 12 annas according to the formulæ.
0 8	Do.	20 $\frac{1}{2}$	10 $\frac{1}{11}$ kadbi, 2 $\frac{1}{7}$ chaff.	<i>Experiment No. 24.</i> — <i>Juvār</i> on <i>jirāyat gorādu</i> soil of fair quality growing during the preceding 4 years:—(1) <i>Kodra</i> and rice, (2) <i>Juvār</i> , (3) rice, (4) cotton. Field dressed with about 20 carts of ordinary manure per acre. Season very favourable and tillage good. Seed-rate very high. Grain yield full maximum according to formulæ.
0 8	38 $\frac{1}{8}$ (weight.)	21 $\frac{1}{2}$	5 $\frac{1}{5}$	<i>Experiment No. 25.</i> —Continuous rice, <i>Sukhvel</i> , on good black soil manured with 37 carts of farm-yard manure applied before sowing. A second crop of tobacco was taken in 1891-95, but this is not usual. About 5 gunthas of seed-bed which got no special treatment furnished seedlings for 36 gunthas of field. The crop suffered from absence of rain since middle of August but it was relieved by 8 waterings in November and December from the village tank. Tillage good and yield more than full average.

Summary of Crop Experiment Reports,

O. S. = Original Survey ;

No.	District, Taluka, Village and Experimenter,	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formulae.	AVERAGE PER ACRE.					
					Seed.	Yield of		Total Value of Produce.	Assessment, excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.
						Principal Product.	By-Product.			
1	2	3	4	5	6	7	8	9	10	11
	BROACH—continued.		Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.
26	<i>Mr. Sorabshah Hormasji,</i> District Deputy Collector. Jambusar (Nadiad) ...	Cotton (Deshi), 12th March to 13th May 1897.	13	340	5	122 seed cotton.	...	9 10 10	3 6 11 O. S.	35.46
	SURAT.									
	<i>Mr. O. N. Seddon,</i> Assistant Collector.									
27	Jalalpur (Supa) ...	Great millet (Chapti Juvár) with Phaseolus mungo (Mag).	14	1,050	8½	863 12	270 bundles.	36 0 4	3 10 6 O. S.	10.15
	<i>Mr. Pránlal Harkisondas,</i> District Deputy Collector.									
28	Balsár (Mográwadi) ...	Rice (Kada), 12th October 1896.	8	1,125	130	1,793 in husk.	3,200	54 6 9	17 13 8 O. S.	32.80
29	Párdi (Palsána) ...	Do. 13th October 1896.	12	1,460	130	2,861 Do.	3,520	75 13 9	11 5 4 O. S.	14.94
30	Chikhli (Thala) ...	Do. 14th October 1896.	16	2,025	120	3,293 Do.	4,210	91 15 9	8 7 9 O. S.	9.22
31	Do. (do.) ...	Do. ...	16	2,025	120	3,231 Do.	4,060	90 3 11	10 7 3 O. S.	11.58
32	Párdi (Motiváda) ...	Paspalum scrobiculatum (Kodra), 17th November 1896.	12	790	42	1,599	2,295	40 10 7	0 15 1 O. S.	2.34
33	Balsár (Gorwáda) ...	Do. do. 18th November 1896.	12	960	43	2,017	2,570	50 4 9	1 6 1 O. S.	2.74
	<i>Mr. Jivanlal Pranjiwandás,</i> District Deputy Collector.									
34	Mándvi (Karanj) ...	Great millet (Bhár Juvár), 6th January 1897.	8	525	6½	457	1,202 kadbi, 108 chaff.	24 4 11	2 5 7 O. S.	9.66
	<i>Mr. P. R. Mehta,</i> Assistant Superintendent, Gujarat Revenue Survey.									
35	Balsár (Atgam) ...	Castor seed (Divela), 14th February 1897.	8	225	40	125 seed.	...	6 6 10	0 15 9 O. S.	15.30
36	Balsár (Endargota) ...	Do. do. 16th February 1897.	6	170	37	126 Do.	...	6 7 11	1 8 3 O. S.	23.30
37	Párdi (Vághchhipa (small)) ...	Do. do. 24th February 1897.	18	525	42	324 Do.	...	16 9 10	0 10 11 O. S.	4.10
38	Párdi (Chhiri) ...	Do. do. 6th March 1897.	14	390	40	350 Do.	..	17 15 3	0 12 8 O. S.	4.41

Northern Division, 1896-97—concluded.

R. S. = Revision Survey.

Area of Test.	Equivalent in Tolas of local measure Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
		Principal Product	By-Product.	
12	13	14	15	16
A. g.	Tolas.	Lbs	Cwts.	
0 10	40 (weight.)	12 $\frac{3}{4}$	...	<i>Experiment No. 26.</i> — <i>Deshi</i> cotton on good black soil growing cotton and wheat in alternate years. Field unmanured this year but got a light dressing in the previous year. Seedlings of the first sown seed destroyed by heavy rain. Crop resown late in September. Tillage careful. There were four pickings, all of which were tested. Outturn only 4 annas of the formulæ. Seed-rate low.
0 8	37 $\frac{1}{2}$ (weight.)	27 $\frac{3}{4}$ 29 $\frac{1}{4}$	80 bundles.	<i>Experiment No. 27.</i> — <i>Juvár</i> with <i>mag</i> and <i>tuver</i> on black soil with an admixture of <i>kankar</i> . Cotton and <i>juvár</i> taken alternately without any manure. Land was broken up from grass about 12 years ago. The crop suffered owing to absence of September rain. Season otherwise fairly good. Tillage ordinary. The <i>juvár</i> grain yielded an 11-anna formulæ outturn. The pulses almost failed.
0 4	Do. ...	36 $\frac{1}{8}$	5 $\frac{9}{11}$	<i>Experiment No. 28.</i> — <i>Kada</i> rice on <i>bdgdyat bháta</i> land growing the same crop followed by <i>vdí</i> every year. Field manured with 23 cart-loads of cowdung per acre. Season indifferent owing to absence of late rains. The crop not watered though there was facility for doing so. Seed-rate very high. Tillage bad. Outturn 12 annas of the formulæ. Incidence on the first crop alone.
0 4	Do. ...	40 $\frac{1}{3}$	6 $\frac{1}{4}$	<i>Experiment No. 29.</i> —Same crop on good black soil growing rice followed by <i>vdí</i> every year. Forty loads of manure applied per acre. Season fairly good. Field rather weedy and not well looked after. Seed-rate very high. Outturn 260 lbs. over the maximum of the formulæ.
0 4	Do. ...	38 $\frac{1}{2}$	6	<i>Experiment No. 30.</i> —Same crop on similar soil with identical conditions. Season good and tillage excellent. Other remarks as above. Outturn 1 $\frac{1}{2}$ times the formulæ maximum.
0 4	Do. ...	38 $\frac{1}{3}$	5	<i>Experiment No. 31.</i> —Do. do. do. do.
0 8	Do. ...	41 $\frac{1}{8}$	8	<i>Experiment No. 32.</i> — <i>Kodra</i> on light-brown <i>gorát</i> soil growing without manure the same crop every year. Season fairly good. Tillage indifferent. Seed-rate high. Outturn full maximum. By-product over-valued at Rs. 2-8-9 per acre.
0 8	Do. ...	41 $\frac{1}{8}$	8	<i>Experiment No. 33.</i> —Same crop on black soil growing <i>nágli</i> for two years followed by <i>kodra</i> in the next two. Season, &c., as above. Outturn excellent, being 1 $\frac{1}{2}$ times the formulæ maximum. By-product over-valued at Rs. 2-13-8 per acre.
0 8	Do. ...	24 $\frac{1}{2}$	2 $\frac{1}{2}$ kadbi, 1 $\frac{1}{2}$ chaff.	<i>Experiment No. 34.</i> — <i>Bhár juvár</i> on fairly good black <i>raichickan</i> soil growing cotton and <i>juvár</i> with pulses in alternate years. Field not manured. Early rains were heavy and the later ones absent, which affected the crop and reduced outturn to below 7 annas of the formulæ.
0 10	Do. ...	19 $\frac{1}{2}$	...	<i>Experiment No. 35.</i> —Castor seed, <i>divela</i> , on part of a field lying fallow for over 15 years. Rice, <i>kodra</i> with <i>tuver</i> , castors and <i>nágli</i> with occasional fallows taken on other parts of the field. Land uneven and full of limestones and broken up for cultivation in the present year only. Season very unfavourable but for the late November rain. Seed-rate high. Yield 4 annas of the formulæ.
0 10	Do. ...	19 $\frac{1}{2}$	...	<i>Experiment No. 36.</i> —Same crop on similar, but level and superior, soil growing <i>juvár</i> , <i>kodra</i> and castors with intervening fallows. Season as above. Tillage good.
0 10	Do. ...	19 $\frac{1}{2}$	...	<i>Experiment No. 37.</i> —Same crop on uneven poor land full of lime that grew <i>bábhul</i> for the last 18 or 20 years. Season favourable owing to late November rains. Tillage good. Crop 13 annas of the formulæ.
0 10	Do. ...	19 $\frac{1}{2}$	...	<i>Experiment No. 38.</i> —Same crop on best <i>ovania</i> soil, i. e., rich soil situated in the midst of a water-course. Same crop grown every year without any manure.

Summary of Crop Experiment Reports,

O. S. = Original Survey ;

No.	District, Taluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formula.	AVERAGE PER ACRE.					
					Seed.	Yield of		Total Value of Produce.	Assessment, excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.
						Principal Product.	By-Product.			
1	2	3	4	5	6	7	8	9	10	11
BELGAUM.										
<i>Mr. J. L. Lushington, Superintendent, L. R. and Agriculture, S. D.</i>			Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.
39	Khánápur (Khánápur) ...	Rice (Mukhute), 15th November 1896.	4	140	60	360 in husk.	4,100	22 0 6	2 12 2 R. S.	12.53
40	Do. (do.) ...	Do. (Mugad), 16th November 1896.	8	400	42	2,142 Do.	3,520	91 14 0	3 6 1 R. S.	3.68
41	Do. (Rumevádi) ...	Eleusine coracana (Dongri Náchni), 17th November 1896.	2	60	27	85	1,350	5 14 8	0 6 0 R. S.	6.34
DHARWAR.										
<i>Mr. F. G. H. Anderson, Assistant Collector.</i>										
42	Ránebennur (Halgeri) ...	Great millet (Jowá-ri), 28th November 1896.	14 to 15	940 to 1,030	3½	1,048 good grain, 130 damaged grain.	10½ káts.	38 3 2	1 12 4 R. S.	4.63
43	Do. (do.) ...	Do. do. ...	3 to 4	70 to 100	4½	157	1½ káts.	5 7 0	0 8 10 R. S.	10.15
<i>Mr. C. R. Roper, Assistant Collector.</i>										
44	Dhárwar (Mugad)...	Rice, December 1896.	12	750	85½	3,048 in husk.	3,934	87 10 8	5 3 8 R. S.	5.96
<i>Mr. K. N. Bhángaonkar, District Deputy Collector.</i>										
45	Navalgund (Annigeri) ...	Sesamum (Valle Yellu), 22nd September 1896.	10	210	¾	179	356	9 13 4	1 11 7 R. S.	17.53
KOLA'BA.										
<i>Mr. H. O. W. G. Brooke, Assistant Collector.</i>										
46	Pen (Palas),	Rice (Patni), 10th November 1896.	4	175	68	715 in husk.	1,300	24 2 8	7 12 9 R. S.	32.26
RATNA GIRI.										
<i>Mr. A. W. G. Chuckerbutty, Assistant Collector.</i>										
47	Rájápur (Lánja) ...	Niger seed (Kárala Til), 19th October 1896.	8	100	...	25 seed.	260	1 10 0	0 4 4 O. S.	16.66
48	Do. (Soundal) ...	Eleusine coracana (Mahan Khandála Náchni), 3rd November 1896.	11	620	14	721	139	29 13 11	0 5 4 O. S.	1.11

Southern Division, 1896-97.

R. S. = Revision Survey.

Area of Test.	Equivalent in Tolas of local measure Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
		Principal Product	By-Product.	
12	13	14	15	16
A. g.	Tolas.	Lbs.	Cwts.	
0 4	52	$28\frac{2}{5}$	4	<i>Experiment No. 39.</i> — <i>Murkhute</i> rice on red <i>masdri</i> slightly sandy soil growing the same crop every year. Field lightly dressed with 5 carts per acre of cowdung and sweepings. Field situated on high level and therefore escaped damage from early excessive rain. Crop suffered from scant late rainfall. Outturn figures of doubtful accuracy; probable that no allowance made for dryage. Yield represents a 7-anna crop of the formulæ.
0 4	58	$25\frac{3}{8}$	$4\frac{3}{16}$	<i>Experiment No. 40.</i> —Big <i>Mugad</i> rice on favourably situated black <i>manik</i> land. The field grows rice every year and was manured this year with 6 carts per acre of cowdung and sweepings. Season as above. Crop did not suffer, as it received moisture from higher-lying fields and also water from an adjoining spring. Seed-rate low. Tillage good. Outturn full maximum of the formulæ. Sample $2\frac{1}{2}$ <i>tolas</i> short of the reported weight. Prices high owing to famine in the neighbourhood.
0 8	66	$23\frac{9}{13}$	$5\frac{1}{7}$	<i>Experiment No. 41.</i> — <i>Nagli</i> on sandy <i>revad</i> upland sloping land that grew <i>kulthi</i> in the previous year and lay waste previous to that. Field manured with $2\frac{1}{2}$ carts of cowdung and sweepings. The field is cropped for 3 or 4 years and then allowed to lie fallow for 3 years. Season unfavourable owing to deficiency of early rain, excess of June-July rain, and scant late rain.
0 $9\frac{2}{5}$	143	36 good grain, $39\frac{1}{2}$ damaged grain.	2 káts.	<i>Experiment No. 42.</i> —Kharif <i>jowári</i> on good black soil growing <i>jowári</i> with pulses and cotton in alternate years. Field manured with 8 cart-loads of ordinary manure per acre. Season rather unfavourable owing to excessive rain in the early part and total failure later. Tillage excellent. Seed-rate low. Sample 4 <i>tolas</i> short of the reported weight. Subordinate pulses not tested.
0 $10\frac{2}{3}$	142	$35\frac{4}{5}$	2 káts.	<i>Experiment No. 43.</i> —Same crop on medium red soil growing (1) <i>adva</i> , (2) <i>jowári</i> , and (3) chillies during the past 3 years. Field very lightly manured. Season as above. Red soil being unretentive of moisture, the crop suffered considerably. The crop was sparsely planted owing to damage by early rain, and the drought later on prevented the ears filling. Tillage indifferent. Yield, exclusive of untested pulses, 7 annas according to the formulæ. Sample as above 4 <i>tolas</i> short of the reported weight.
0 5	117	36	$11\frac{5}{7}$	<i>Experiment No. 44.</i> —Rice on reddish hard <i>kemp masdri</i> soil growing the same crop with sugarcane and chillies almost every year. Field not manured for the last 3 years. It is irrigated from a tank in an adjoining field, but the extent of irrigation not reported. Season indifferent. Tillage fair. Outturn double the formulæ maximum. Sample 109 <i>tolas</i> only. Hence figures untrustworthy.
0 10	$124\frac{3}{4}$	$19\frac{1}{5}$	$6\frac{5}{14}$	<i>Experiment No. 45.</i> —Sesamum on rich black soil growing cotton alternately with <i>jowári</i> , gram, linseed or sesamum. Field manured with about 4 carts per acre of cattle-dung and sweepings. Rain scanty and unseasonable. Cultivation good. Outturn 9 annas of the formulæ. Incidence rather high owing to unfavourable season.
0 8	$55\frac{1}{4}$	34	$3\frac{5}{7}$	<i>Experiment No. 46.</i> — <i>Patni</i> rice on mixed red and black sandy soil lying between salt lands and hills. It grows the same crop every year, also 2nd crops of <i>vali</i> . Field manured with 4 carts of <i>ráb</i> materials and receives the wash from the hill side. The crop suffered from excessive rain in July and still further from total failure of rain after August. Tillage good. The outturn is equal to about 10 annas of the formulæ yield. The sample received in this office weighed $47\frac{1}{2}$ <i>tolas</i> only.
0 10	$32\frac{1}{8}$	$16\frac{1}{2}$	19	<i>Experiment No. 47.</i> —Niger seed, last crop in the rotation, on slightly sloping gravelly <i>bharad varkas</i> land that grows (1) <i>nagli</i> , (2) <i>harik</i> , and (3) niger after 3 years' fallow. No manure used. Season bad owing to absence of rain in the latter part of the season. Outturn only 3 annas according to formulæ.
0 8	36	25	7	<i>Experiment No. 48.</i> — <i>Nagli</i> on <i>varkas</i> land superior to the above, being flat and low lying. The field grows (1) <i>vari</i> , (2) <i>harik</i> and (3) <i>nagli</i> for three years and then lies fallow for 3 years. Crop grown from seedlings transplanted into holes. A piece of dried fish placed as manure in each hole before transplantation, $14\frac{1}{2}$ maunds being given per acre. Tillage very careful. Proportionate area of seed-bed to area of plantation not reported.

Summary of Crop Experiment Reports,
O. S. = Original Survey;

No.	District, Táluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formulae.	AVERAGE PER ACRE.					
					Seed.	Yield of		Total Value of Produce.	Assessment, excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.
						Principal Product.	By-Product.			
1	2	3	4	5	6	7	8	9	10	11
RATNAGIRI—contd.			Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.
<i>Mr. A. W. G. Chuckerbutty, Assistant Collector—contd.</i>										
49	Rájápur (Soundal) ...	Eleusine coracana (Mahan Khandála Náchni), 3rd November 1896.	5	150	18	260	122	11 15 10	0 5 4 O. S.	2.78
50	Devgad (Nádgaon) ... <i>Mr. L. C. Swift, Assistant Collector.</i>	Paspalum scrobiculatum (Harik), 12th November 1896.	6	100	17	98	835	1 9 7	0 5 1 O. S.	19.87
51	Chiplún (Tausál) ...	Eleusine coracana (Nágli), 22nd October 1896.	5	185	11	454	1,440	15 13 4	0 3 2 O. S.	1.25
52	Do. (do.) ...	Paspalum scrobiculatum (Harik), 22nd October 1896.	5	90	43	301	1,611	6 10 7	0 2 8 O. S.	2.50
53	Dápoli (Dápoli) ...	Do. 19th November 1896.	5	75	29	351	18 bundles.	12 10 4	0 2 7 O. S.	1.27
54	Do. (Harnai) ... <i>Mr. V. R. Kelkar, District Deputy Collector.</i>	Do. 24th November 1896.	11	310	29	585	36 bundles.	21 7 2	0 3 0 O. S.	0.87
55	Ratnágiri (Nani) ...	Eleusine coracana (Nágli), 24th October 1896.	11	620	10	680	1,062	24 1 10	0 6 0 O. S.	1.55
56	Sangameshvar (Devrukh) .	Do. 3rd November 1896.	11	775	7½	431	846	13 15 5	0 5 6 O. S.	2.46
57	Do. (do.) ... KANARA. <i>Mr. L. G. Deshmukh, Assistant Collector.</i>	Paspalum scrobiculatum (Kodra), 2nd November 1896.	10	310	31	470	...	8 4 11	0 5 4 O. S.	4.01
58	Honávar (Hulegár) ...	Rice (Vaingan Chitga), 12th March 1897.	12	...	118	704 in husk.	1,695	24 8 1	3 12 9 O. S.	15.49
59	Do. (Saralgi) ... <i>Mr. G. F. Keatinge, Assistant Collector.</i>	Sugarcane (Dashkhabbu), 14th March 1897.	8	1,200	12,000 sets.	1,330 liquid jag-gery.	14,820 seed tops.	137 1 11	4 2 6 O. S.	3.03
60	Kárwár (Kone) ... <i>Mr. R. P. Benegiri, District Deputy Collector.</i>	Rice (Belpandia), 9th October 1896.	10	460	142	2,012 in husk.	1,841	42 7 2	4 13 0 O. S.	11.33
61	Kárwár (Bád) ...	Do. (Pandia), 7th October 1896.	12.	750	193	2,096 Do.	2,927	45 4 0	4 8 2 O. S.	9.96

Southern Division, 1896-97—concluded.

R. S. = Revision Survey.

Area of Test.	Equivalent in Tolas of local measure Ser.	PRICE OF PRODUCE PER RUPEE.		REMARKS.
		Principal Product.	By Product.	
12	13	14	15	16
A. g.	Tolas.	Lbs.	Cwt.	
0 2	35	24 $\frac{1}{4}$	17	<i>Experiment No. 49.</i> —Same crop on similar soil growing apparently only one crop of <i>nāgli</i> after 10 years of rest. Seedlings were transplanted as usual from the seed-bed but no manure was used. Season, &c., as above. Outturn 7 annas of the formulæ. Seed-rate very high. Test area below the prescribed minimum.
0 2	33 $\frac{1}{2}$	61	...	<i>Experiment No. 50.</i> — <i>Harik</i> on <i>bharad varkas</i> land lying half way up a gently sloping hill. It grows (1) <i>kulith</i> , (2) <i>nāgli</i> , (3) <i>harik</i> (4) <i>niger</i> and (5) <i>sarvat</i> rice and lies fallow for next 5 years. Field not manured. Season as above. Tillage ordinary.
0 2	54 $\frac{1}{2}$	34	5 $\frac{1}{2}$	<i>Experiment No. 51.</i> — <i>Nāgli</i> on <i>bharad varkas</i> land growing (1) <i>nāgli</i> , (2) <i>vari</i> , (3) <i>harik</i> and (4) <i>niger</i> -seed after five years' fallow. Seed-bed rābed with 40 head-loads of cowdung, 60 of <i>kaval</i> and 60 of grass per acre. Proportionate area of seed-bed not ascertained. Season unfavourable owing to deficient late rains. Tillage fair. Outturn 9 annas according to formulæ. Area of test $\frac{1}{4}$ of the prescribed minimum. Sample ser 2 $\frac{1}{2}$ <i>tolas</i> in excess of the recorded weight.
0 7	46 $\frac{1}{2}$	47 $\frac{1}{2}$	23	<i>Experiment No. 52.</i> — <i>Harik</i> on similar land under similar rotation. No manure used. Season, &c., as above. Seed-rate very high. Outturn 10 annas of the formulæ. Area below minimum. Sample 3 <i>tolas</i> in excess of the reported weight.
0 20	47 $\frac{1}{2}$	30 $\frac{1}{2}$	16 bundles.	<i>Experiment No. 53.</i> —Same crop on similar but level land by the road-side growing (1) <i>nāgli</i> , (2) <i>harik</i> , (3) <i>til</i> and (4) <i>sarvat</i> rice after 4 years' fallow. Season, &c., as above. Outturn 11 annas of the formulæ. Sample ser 3 $\frac{1}{4}$ <i>tolas</i> over the weight recorded by the experimenter.
0 2 $\frac{1}{4}$	47 $\frac{1}{2}$	30 $\frac{1}{2}$	16 bundles.	<i>Experiment No. 54.</i> —Same crop on upland sloping <i>varkas</i> land growing the usual crops for 4 years followed by 4 years of rest. Outturn 15 annas according to formulæ. Sample exceeded the reported weight by 2 <i>tolas</i> .
0 8	49	30	6	<i>Experiment No. 55.</i> — <i>Nāgli</i> on <i>varkas ma'l</i> land growing (1) <i>nāgli</i> , (2) <i>vari</i> , (3) <i>harik</i> , (4) <i>sarvat</i> rice and (5) <i>niger</i> -seed after 5 years of rest. Season favourable in the early part but later rains completely failed and reduced outturn. 20 maunds of fish manure used at time of planting seedlings. 14 gunthas of seed-bed required for an acre of plantation. Tillage good.
0 8	57 $\frac{1}{2}$	35 $\frac{3}{8}$	3 $\frac{1}{2}$	<i>Experiment No. 56.</i> — <i>Nāgli</i> on similar land growing a number of crops on different portions of the field. The portion occupied by test crop lay fallow in the preceding year. It is cropped for 3 years and then lies at rest for 4 years. No manure used. Season, &c., as above. Outturn low.
0 8	46	56 $\frac{3}{8}$	...	<i>Experiment No. 57.</i> — <i>Harik</i> on similar land growing (1) <i>nāgli</i> , (2) <i>harik</i> and (3) <i>niger</i> -seed and lying fallow during the succeeding 4 years. Season, &c., as above. Outturn 12 annas of the formulæ.
0 8	154	36	3	<i>Experiment No. 58.</i> — <i>Vaingan</i> rice grown as a second crop on <i>hoinge</i> sandy soil. The field lay waste 2 years ago. It grew late rice only in the previous year and both early and late rice in the current season. Field manured with 125 loads of compost of cowdung and tree loppings, &c., per acre for the second crop. It was irrigated from a tank for 2 $\frac{1}{4}$ months every alternate day. Water in the channel deficient owing to failure of late rains. Sample 4 <i>tolas</i> short of the recorded weight. Incidence on the second crop alone.
0 4	234 (a pot measure)	23 $\frac{1}{2}$	250 seed tops.	<i>Experiment No. 59.</i> —Sugarcane on yellowish clayey soil largely mixed with sand growing rice for 2 years followed by sugarcane in the 3rd year. Grass, leaves and branches spread on the field and burnt. One month after planting, burnt earth applied round young shoots and about 1,000 head-loads of compost of manure per acre put on 2 months later. Season very unfavourable. Crop watered from a well only in the early stage of its growth. In July rain excessive and field water-logged. Later on rain was totally absent and the crop not watered for reasons not known. Outturn very poor. Seed tops valued at Rs. 59-4-0 per acre. Dry leaves not valued, as left on the field for being burnt as manure.
0 4	61 $\frac{1}{2}$	50 $\frac{1}{2}$	6 $\frac{1}{2}$	<i>Experiment No. 60.</i> — <i>Belpandia</i> rice on sandy dark-brown soil growing the same crop every year but no second crop. About 20 baskets of compost of cowdung and leaves used per acre. Season unfavourable owing to excess of rain in the early part and its absence later on. Outturn 1 $\frac{1}{4}$ th times the formulæ maximum. Sample of measure ser of grain not received in this office as required by standing orders.
0 4	62 $\frac{1}{8}$	53 $\frac{3}{8}$	4 $\frac{5}{8}$	<i>Experiment No. 61.</i> —Rice on sandy <i>hoinge manna</i> soil with retentive sub-soil growing the same crop every year without a second crop. 300 head-loads of compost of paddy husk, cowdung and dry leaves applied per acre before sowing. Season, &c., as above. Field overflowed in the early part of the season which prevented full growth of the crop. Outturn, however, 1 $\frac{1}{2}$ rd times the formulæ maximum. Seed-rate high. Sample 3 <i>tolas</i> short of the reported weight.

CROP EXPERIMENTS
BOMBAY PRESIDENCY,

1897-98.



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FROM

A. BROWNLOW FFORDE, ESQUIRE,
Survey Commissioner and Director,
Land Records and Agriculture,
Bombay;

To

J. W. P. MUIR-MACKENZIE, ESQUIRE, M.R.A.C.,
Secretary to Government,
Revenue Department,
Bombay.

Poona, 16th November 1898.

SIR,

I have the honour to submit herewith the usual Analysis of Crop Experiments made in 1897-98 prepared by Mr. J. W. Mollison, Deputy Director of Agriculture.

2. The table given below exhibits the extent of work done :—

Division.	1895-96.		1896-97. .		1897-98.	
	Reported.	Rejected.	Reported.	Rejected.	Reported.	Rejected.
Northern Division ...	179	4	88	...	66	...
Central do. ...	45	8	...	...	41	5
Southern do. ...	42	3	24	1	20	...
Total ...	266	15	62	1	127	5

The large number of experiments shown against the Northern Division during 1895-96 is due to the inclusion of the very great number of experiments specially undertaken in the Surat district under the orders of Government for gauging the incidence of the current assessment with a view to determine the extent and nature of future revisions. During 1896-97 the work of crop experiments had considerably to be curtailed in many districts owing to the demands of famine and plague upon the time of officers and to extensive failure of crops. During the year under report also engagement on plague duties has resulted in no reports being received from Surat and Belgaum districts, and the programme laid down has been, more or less, hampered elsewhere.

3. The arrangement of taking special tests, as in Surat, was intended to be made in Broach during 1896-97. But owing to the unfavourable aspect of the season it had to be postponed for a year. During the year under report, arrangements were accordingly made for carrying out these experiments. But owing to paucity of officers, the programme could only be partially carried out. Mr. Mollison himself conducted 19 experiments in this connection and all the other officers together only 12.

4. Of the total number of experiments reported, 19 were performed by Mr. Mollison as stated above, 8 by Survey officers, 6 by the Superintendent, Land Records and Agriculture, C. D., and the rest (94) done by the officers of the Revenue Department. The Superintendent, Land Records and Agriculture, S. D., could not experiment, as he was placed on plague duty.

5. Only five experiments have been rejected. There are, however, some others which have been reported in the tabular summary and classed as unsatisfactory or untrustworthy.

6. All the experiments reported are "ordinary", as in recent years preference has been given to these over the "special" in order to secure as large a number of tests as possible to furnish data for the quinquennial return of out-turn statistics required by the Secretary of State for India.

7. The working of the programme has been noticed in detail in the Analysis. The following table exhibits the distribution of tests over the several crops selected for experiment. The crops, which are intended to find entry in the quinquennial return, have been marked with an asterisk :—

Division.	* Rice.	* Wheat.	* Jowári.	* Bájri.	* Náglí.	* Kodra.	* Gram.	* Láng.	* Sugarcane.	* Sesamum.	* Linseed.	* Rapeseed.	* Niger seed.	* Groundnut.	* Castor seed.	* Potatoes.	* Onions.	* Cotton.	* Hemp.	Total.
Northern Division ...	2	18	13	5	2	3	5	5	...	3	...	1	...	...	3	...	...	5	1	66
Central Division ...	1	11	6	8	...	...	5	...	...	...	1	...	...	1	...	1	1	1	...	36
Southern Division ...	...	1	6	...	4	3	2	...	1	...	1	...	1	...	...	...	...	1	...	20
Total ...	3	30	25	13	6	6	12	5	1	3	2	1	1	1	3	1	1	7	1	122

8. As Mr. Mollison has, in the Analysis, fully dealt with all the principal facts in connection with each experiment, it seems unnecessary to review them in detail.

9. In the Northern Division several instances of high incidence are met with particularly in the Broach district. These may partly be ascribed to the unfavourable character of the season (late commencement and early closure of the rains), and partly to indifferent cultivation; but in this district it is the year in which the valuable cotton crop is grown in rotation that the land is highly remunerative.

10. In the Central Division there are to be noticed a few cases of high incidence, but the result has been explained to be due, as above suggested, either to indifferent cultivation or to the unfavourable season. In one case, (Exp. No. 78), the incidence has been calculated on the second crop alone, and in another, (Exp. No. 93), the field is capable of growing rich garden crops, and the test crop grown was apparently sown as a rotation crop only to give rest to the land.

11. In this Division a good many tests have, this year, been taken on Pátasthal and Motasthal lands. The owners in the case of Experiments Nos. 77 and 83 appear to have been well rewarded for their careful management in securing rich outturns. The yield of Bájri in Exp. No. 88 and that of gram in Exp. No. 98, both grown as dry crops, also appears to be quite satisfactory.

12. In the Southern Division there is only one case (Exp. No. 108) which shows high incidence; but here the tested crop (gram) was sown mixed with Jowári and formed an unrecorded proportion of the whole produce. Such experiments are of little value, and experimenters have already been advised by this office to avoid tests on such mixed crops, unless they can find it convenient to test all the crops cultivated.

13. It is to be regretted that many officers have this year been found to have neglected standing orders regarding the test weighments to be taken of the local measure *sers* of grain and have not forwarded *exact* contents of these *sers* to this office. These latter gave over weights in my office which it is impossible to account for, unless it is supposed that the experimenters forwarded samples in excess of the *exact sers*. As the inexactness of these weights materially affects the total per acre outturn and throws considerable doubts on the experiment as a whole, it is hoped that experimenters will attend to the rules more carefully in future.

14. Mr. F. B. Young, Superintendent, Land Records and Agriculture, C. D., Mr. Pheroosháh Pestanji (Násik), Mr. Sale (Poona), Mr. Kelkar (Bijápúr), and Mr. Keatinge (Kánara) deserve special mention for their careful and intelligent reports. Thanks are also due to Mr. Mollison, who, notwithstanding his ill-health, carried out as many as 19 experiments in the Broach district.

I have the honour to be,

Sir,

Your most obedient Servant,

A. BROWNLOW FFORDE,

Survey Commissioner and Director,
Land Records and Agriculture.

ANALYSIS OF CROP EXPERIMENTS.

NORTHERN DIVISION.

Ahmadabad.

Experiments on rice, wheat, *jowár*, *bájri* and gram were arranged for in this district. Three experiments on the required crops have been received from each of the three charges into which the district has been divided.

Mr. H. D. Rendall, Assistant Collector,

Submits two experiments; one on rice and another on *jowár*.

The rice (Exp. No. 1) was grown on good black soil, on which the same crop is grown every year. The field was manured with 18 carts of cowdung per acre. It is irrigated from an adjoining tank by means of a lift. The season was unfavourable. Rain did not fall soon enough for rice and fell in heavy downpours later which were disastrous for dry crops but not so harmful for rice. The tested crop was somewhat dried up and the grain not properly filled. The experimenter further states that in many villages in the *táluka* rice had been a very poor crop and in some cases hardly paid expenses of cultivation. The reported seed-rate is very low, only 7 lbs. per arce. Seed was sown in July and transplanted a month later. The outturn came to 942 lbs. grain and 1,477 lbs. straw per acre, together worth Rs. 29-13-4. The incidence comes to 15·19 per cent.

Mr. Rendall's second test (No. 2) was taken on dry-crop *gorádu* land. Here *jowár* and *math* are sown in alternate years. The field was not manured this year, but last year got about 14 carts of cowdung per acre. The season was poor. Late rain falling very heavily did a great deal of damage to the *jowár* and the crop, like others in the *táluka*, was poor. About 18 lbs. seed per acre was used. The outturn came to 195 lbs. grain and 5,800 lbs. *kadbi*, together worth Rs. 15-9 per acre. The by-product was more or less green when weighed and would lose weight to a considerable extent by dryage. The incidence, 15·62 per cent., is not high considering the season. The grain produce was, however, only worth about twice the amount of assessment.

Mr. C. V. Vernon, Assistant Collector,

Submits three tests; one each on *jowár*, *bájri* and wheat.

The *jowár* (Exp. No. 3) was raised on a highly assessed field about a mile distant from Ahmadabad. It is probable that the variety grown was *Sundhia*. I judge of this by the high seed-rate. *Sundhia* requires a thick seeding, and is a fine fodder variety. The *kadbi* is often much more valuable than the grain and this would be specially the case in the neighbourhood of a large city like Ahmadabad. *Jowár* has been the chief crop grown during the past three years with small patches under castors and tobacco, 2 to 3 gunthas. The field is reported to have been manured with about 35 carts of cowdung and town refuse per acre, the carting alone costing about Rs. 10. Cultivators are apt on all occasions to make exaggerated statements regarding the quantity of manure they use, and it is probable that the field received a much lighter application than that reported. The experimenter states, however, that manure is plentiful and cheap in Ahmadabad. The season was not quite favourable. The crop was lodged owing to heavy late rains. The cultivation was good. About 76 lbs. of seed sown at end of June produced in about $4\frac{1}{2}$ months 205 lbs. good grain, 27 lbs. inferior grain, and 735 bundles of *kadbi*, weighing about 5,594 lbs., per acre. The whole has been valued at Rs. 35-13-11. The *kadbi* is perhaps valued high at Rs. 4 per 100 bundles or about a cwt. per rupee. The field has been rented on the half-share system. The owner, a Bania, pays the assessment and seed and manure, and receives half the produce. The cultivator bears all other expenses and gets half the produce.

The *bájri* tested (No. 4) by this officer was grown on *gorádu* land assessed at Rs. 4-7-1 per acre. *Bájri* is the usual crop grown. A second crop is occasionally taken and also sugarcane at times, which shows that the field has irrigation facilities though the experimenter does not say so. The field was

manured this year with about 27 carts per acre of cowdung and nightsoil (one-third quantity of the latter) in the beginning of June. The first seedlings were destroyed by grasshoppers. The seed was therefore sown a second time. This was washed away by heavy rain. A third sowing was therefore made late in the season. *Mag, math* and *tal* were sown along with the *bājri* but the subordinate crops were destroyed by insects. Later rains were favourable for the *bājri*. The outturn came to 526 lbs. grain and 750 bundles of straw per acre together valued at Rs. 34-14-9. The grain as well as the by-product have been valued at very high rates: grain at 23 $\frac{4}{5}$ lbs. per rupee and straw at Rs. 2-8 per 150 bundles. The value of fodder comes to Rs. 12-8 per acre. The outturn is much over-estimated at 16 annas or maximum standard.

The field selected by this officer for a wheat test (No. 5) is irrigable by 2 *kos* worked by four bullocks and the water-supply is said to be ample. Two crops are grown every year in part of the field: maize or *bājri* in the kharif season and wheat and occasionally barley in the rabi. The rest of the field is devoted to a number of garden crops such as chillies, yams, brinjals, &c. The soil is first-class *besar*. It was manured with about 30 carts of cowdung, &c., before the sowing of *bājri*, the first crop. The season was slightly below the average but the crop being irrigated was not in any way affected by the season. After the cutting of the kharif crop the field was watered once and ploughed 4 or 5 times. Seed was then sown at the end of November. No watering was given for about 4 weeks and then regularly once in 8 days till about 3 weeks before reaping. The crop was lodged to some extent by a storm in February. It does not seem to have suffered to any extent thereby. The crop was reaped in the third week of February and gave 1,462 lbs. grain, worth Rs. 53-7 per acre, at 27 $\frac{1}{2}$ lbs. per rupee. The by-product was neither weighed nor valued. The incidence comes to 3.66 per cent.

The number is a *Ját Inám* and is rented to a Sagar, who pays Rs. 24, i.e., about 3 $\frac{1}{2}$ times the assessment (Rs. 7) to the Inámdár. The tenant, though belonging to a backward class, had cultivated the field with all the care necessary in the case of a land growing a number of garden crops. It is not clear why the cultivation is classed as indifferent. The outturn is underestimated at 8 annas. In the original survey the land was classed as *bágáyat* and assessed at Rs. 29. In the revision the assessment has been reduced to Rs. 7 only, the water charge, which amounted to Rs. 24, having been abolished under the new system.

Mr. Pránlál Harkisandas, District Deputy Collector,

Submits a test (No. 6) on gram. The field has *besar gorádu* soil and usually grows rice followed by gram; *jowár* and pulses also grown in the past two years. No manure is ever applied except to the rice seed-bed. The field has a well built before the revision survey. The field is said to be very fertile and capable of producing any crop. It is in the occupation of a Koli. He is not credited with being a high-class cultivator, yet without manure he is generally able to get a better outturn than that of neighbouring fields. The whole field is level and in a lowlying position, so that rice can be grown even with moderate rainfall. In the present year rice was sown rather late and the seedlings withered away before transplantation for want of rain; but it is not clear why they were not saved by irrigating with well water. The cultivator has, with the assistance of his well, grown wheat, barley and safflower on different parts of the field. It is not stated if the test crop was also irrigated. The outturn came to 990 lbs. pulse and 770 lbs. by-product, together worth Rs. 33-10-9 per acre. Both the products have been valued high. The revision rates are apparently very moderate.

Mr. D. N. Nánávati, District Deputy Collector,

Forwards three experiments; two on wheat and one on gram. The report is very meagre.

The first wheat test (No. 7) was taken on a fairly good dry-crop black soil field which, it seems, is never manured and grows wheat, *jowár* and cotton in rotation. The second field (Exp. No. 8) is called *bágáyat*, but the means and extent of irrigation are not reported, and the assessment indicates that it is dry-crop land. It grows without any manure *bājri*, *jowár* and wheat in rotation. The assessment is lower than in the case of the *jiráyat* field. The season is reported

to be favourable in each case and tillage good. Seed was drilled in the first case at the rate of 51 lbs. per acre, thrown broadcast in the second case at the rate of 115 lbs. to the acre.

The outturn results were :—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		Principal Product.	By-product.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
First field (Exp. No. 7) ...	9	337	190	12 10 11	1 14 2	14·86
Second field (Exp. No. 8) ...	7	1,335	1,627	57 0 0	1 2 2	1·99

It seems that the crop in the second case was irrigated. The grain here being of superior quality was worth a higher price than that of the first field. The variety is *Chásia* in the first test, *Potalia* in the second. Both fields are reported to have represented average crops of the respective localities. The by-product in the case of *Potalia* is regarded as useless and therefore not valued.

Mr. Nánávati's third experiment (No. 9) was on gram grown on *jiráyat* black land assessed at Rs. 1-5-10 per acre. No manure is ever used. The field grows gram, wheat and cotton in rotation. The crop was sown under favourable conditions but the cyclonic rain of February did some injury. The crop yielded 295 lbs. pulse and 156 lbs. chaff, together worth Rs. 10-1-4 per acre. The incidence comes to 13·53 per cent., due to poor outturn.

Kaira.

Experimenters were asked to take two tests on *bájri* and to select for their other tests *kodra*, *rági* and gram in the order of their entry. Mr. D'Souza conducted only two tests on *bájri*. Mr. Modi did one experiment each on *bájri*, *kodra* and *rági*, and in addition four experiments on wheat in the Mátar taluka.

Mr. F. X. D'Souza, Assistant Collector,

Submits two tests on *bájri*. The report is very sketchy. The experiments were taken in the beginning of October and the report submitted at the end of the following May.

Both fields (Exp. Nos. 10 and 11) are described as *jiráyat*. In the first field *bájri* with the usual mixtures are taken every year. In the second field a greater variety of crops are grown. These include *bávto*, rice, *rátadia* *jowár*, tobacco and various pulses, but the chief area annually is under *bájri* with subordinate pulses. The subordinate mixtures were not ripe at date of experiment and have not been tested. They were only a sprinkling in the first field, a somewhat more in the second. The cultivator was a Káchia in both instances. The season was favourable and tillage good. Six cart-loads of manure were applied to the first field and 7 to the other. The kind of manure used is not reported.

The outturn results were :—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		Principal Product.	By-product.			
	As.	Lbs.	Bundles.	Rs. a. p.	Rs. a. p.	
First field (Exp. No. 10) ...	9	903	1,015	47 9 0	5 1 10	10·76
Second field (Exp. No. 11) .	7	303	280	16 15 1	4 2 0	24·14

The grain has been valued high at $27\frac{1}{3}$ lbs. per rupee in the first case and $24\frac{1}{3}$ lbs. in the second. The by-product has also been overvalued at Rs. 14-9 per acre in the first field. The experimenter ought to have commented freely regarding the reasons why the outturn in the one field is about three times that in the other. It is impossible that such a striking difference can be due to any material difference in the inherent qualities of the soils. It is more likely due to the effects of season or tillage or some other cause that could be explained.

Mr. B. E. Modi, District Deputy Collector,

Submits 7 experiments, one each on *bājri*, *bávto* and *kodra* and 4 on wheat.

The *bājri* crop (No. 12) was tested on a sandy alluvial *gorádu* soil field assessed at Rs. 4-8-11 per acre. It grew during the previous three years (1) *kodra*, (2) castors and (3) *kodra*, the *kodra* being as usual mixed with *tuver* in both years. *Math* was sown along with the *bājri*. No manure has been used for the past three years. The season was unfavourable. Rain held off at commencement, and did not permit timely sowing, and in the latter part it was incessant. The outturn was very poor, only 124 lbs. of grain and 510 lbs. of straw per acre, together worth Rs. 6-5-3. It is estimated that the *math* will yield about 80 lbs. per acre. Usually *math* spreads out rapidly after the *bājri* harvest, if the plants have not previously been suppressed; and at the time the *bājri* was reaped it was no doubt difficult to estimate the pulse outturn with any degree of exactness. The uncultivated borders measured 10 gunthas in a field of 2 acres. Usually a border is left in most cultivated fields in the Kaira district. This border is not necessarily unprofitable. On the contrary it usually grows grass of first-rate quality which is either grazed by tethered cattle or cut twice during the season. The field has been let for Rs. 12, Baroda currency. The *bājri* is over-estimated at 10 annas.

The *bávto* in the second experiment (No. 13) gave a much better return. That crop likes heavy rain and would not certainly be damaged by heavy down-pours in the same way as *bājri*. The number is small, only 12 gunthas. Of this, 4 gunthas formed uncultivated strips. It is rented on the half-share system: the owner to pay assessment and supply the manure, the tenant to do the rest. The field is manured every 3rd or 4th year. It got in the previous year about 10 carts per acre of ordinary refuse. *Kodra* was grown in 1894 and 1895 and *bávto* in 1896 and 1897. The season was favourable. Seed was sown in the seed-bed as usual and transplanted over the field. The area of the seed-bed was not ascertained. *Math* was sown along with the *bávto* and is expected to yield about 180 lbs. per acre. The *bávto* yield came to 1,323 lbs. grain and 3,645 lbs. by-product per acre, together worth Rs. 42-13. The incidence is 15·57 per cent., which is quite moderate. The acre yield is estimated without taking count of the uncultivated strips.

Kodra formed the subject of Mr. Modi's third test (No. 14). It was sown on *gorádu* soil with the usual pulse mixtures. The land is manured with about 6 cart-loads of the ordinary manure every year. *Bávto* was grown in the previous two years and *kodra* for two years before that. Season is reported to be favourable and tillage good. But the outturn is very low, only 338 lbs. of grain per acre, valued at 41 lbs. per rupee, worth Rs. 8-9. The experimenter estimates the subordinate pulses to yield about 140 lbs. of grain per acre. Ordinarily in the district the return from the subordinate mixture is reckoned to be in value more than equal to the *kodra*. This cereal may be called the principal crop but in an ordinary season it is not. The experimenter attempts to estimate the probable outturn for each of the subordinate crops. He could not possibly do so in the case of *tuver*. That crop would not reach maturity for several months later. In the meantime it may have branched out in an amazing manner, as it generally does in this district, and probably when reaped gave a handsome outturn. For this reason this test is unsatisfactory. The field has been rented on condition of taking $\frac{2}{3}$ produce and supplying manure; the owner, of course, to pay assessment.

The last four experiments (Nos. 15 to 18) by this officer are on wheat. The first field has *besar* soil and the other three have black soil. The first field

grew rice followed by wheat in the previous year, wheat alone for two years before that. The second field grew rice alone in the previous year and rice as well as wheat two years before. The third and fourth fields grow wheat alone. Wheat alone seems to have been grown in the current year in all the fields. But this is not clear. The fields are manured only once in three years. No manure was applied to any of the fields in the current year. The season is reported to be favourable and tillage good in each case. The first field is stated to have been ploughed and worked with the clod-crusher some 15 times. It was watered and ploughed again just before sowing and watered again a month afterwards. The source from which the crop was irrigated has not been reported. The other three fields were apparently not watered at all, though the outturn in the second case seems to show that it probably had that advantage.

The outturn results were :—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		Principal Product.	By-product.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
First field (Exp. No. 15) ...	12	1,297	1,025	51 0 0	7 8 0	14·71
Second field (Exp. No. 16) .	14	1,243	1,300	55 0 5	6 14 9	12·58
Third field (Exp. No. 17) ...	13	738	405	28 14 6	5 1 7	17·63
Fourth field (Exp. No. 18) .	13	554	390	24 4 0	3 10 7	15·14

Kátha wheat was grown in the first and third fields and has been valued at 26½ lbs. per rupee; white wheat in the other two at 23½ lbs. per rupee. The prices are higher than usual. The incidence is fair throughout.

Panch Maháls.

Two experiments on *bájrí* and an equal number on *kodra* in the Western Maháls and two experiments each on wheat and sesamum in the Eastern Maháls were ordered to be carried out. The required number of tests was carried out, except that Mr. Bharucha, who could not find a second sesamum field fit for experiment, had to select rapeseed instead.

Mr. J. A. G. Wales, Assistant Collector,

Conducted three tests, two on *kodra* and one on *bájrí*. Immediately after completion of the tests, Mr. Wales was transferred to Surat and the results have been tabulated and submitted by his successor with the addition of such remarks as he could decipher from the rough notes left by his predecessor. The report was forwarded to Mr. Wales for further remarks, but he was unable to add any information of importance. He states, however, that the experiments in all details were carried out under careful personal supervision. Mr. Wales was transferred under orders received by telegram on the day he completed his last experiment and the first test was only made three days previously. Mr. Wales did not materially infringe the standing orders, which require reports to be submitted as soon as each test is completed. His successor, however, should not have kept the reports some five months before he submitted them.

The two *kodra* tests (Nos. 19 and 20) were taken on *gorádu* soils which bear very light assessment. The first field has only been recently acquired. The occupancy price was Rs. 44 for 3 acres 19 gunthas. It was cleared of trees, &c., last year and sown this year for the first time. The second field was not tilled in the previous year for want of bullocks. Those owned by the occupant died and were only replaced this year. The season has been described as favourable and tillage good. *Tal* was sown mixed with the *kodra* in the first field, but there was very little of it in the test area.

The outturn results were :—

		Anna Estimate.	Outturn of Grain per Acre.	Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		As.	Lbs.	Rs. a. p.	Rs. a. p.	
First field (Exp. No. 19)	...	9	1,179	31 1 1	0 6 10	1.37
Second field (Exp. No. 20)	...	8	367	9 10 7	0 12 0	7.76

The outturn from the second field is poor ; that from the virgin soil very satisfactory.

The *bajri* crop tested (No. 21) was grown on land assessed at a higher rate. The same crop was taken in the previous year. Season and tillage are described as good ; but the crop was only very middling. Eight to nine carts per acre of cowdung manure were used before sowing. The outturn came to 344 lbs. grain and 2,406 lbs. straw, together worth Rs. 24-15-7 per acre. The by-product has been valued very high at Rs. 13-6-7 per acre.

Mr. Pránlál Harkisandás, District Deputy Collector,

Forwards one test (No. 22) on *bajri*. It was taken on *gorádu* land owned by a Bania. The field grew *bajri* during the previous two years and sugarcane before that, the crop being irrigated by water from a well in a neighbouring field. Twenty carts of cowdung were spread over the field per acre before sowing. Season was favourable and tillage good. Eighteen pounds of seed sown at end of July produced by the middle of November 1,095 lbs. grain and 4,072 lbs. straw per acre, together worth Rs. 60-1-6. The *bajri* straw has been valued at Re. 1 per 100 bundles or at Rs. 23-4-6 per acre. This for an out district is a high rate. The grain is also priced high, at 29 $\frac{3}{4}$ lbs. per rupee. The outturn represents a very good crop. The experimenter says that the field chosen was average for the locality. This is not borne out by Mr. Wales' test on the same crop in the same *táluka*.

Mr. S. M. Bharucha, District Deputy Collector,

Forwards four tests ; one on sesamum, one on rapeseed and two on wheat.

Mr. Bharucha received orders somewhat late and he could only find one sesamum field which had been sown rather late under exceptional circumstances. This field (Exp. No. 23) usually grows maize followed by gram. In the previous year, insects had appeared early in the season and destroyed most of the seedlings. The occupant, therefore, this year tried sesamum. This crop can be seasonably sown fairly late in the season. But the tested crop was sown later than it should have been, and on account of this cause and to deficiency of later rains the crop was not a success. It gave only 292 lbs. of the oil-seed per acre worth Rs. 12-2. The incidence, which comes to 19.41 per cent., must not be regarded as high under the circumstances. The test field has light-brown *gorádu* land and was manured with about six carts of cattle manure per acre. The reported seed-rate is much overestimated.

This officer's rapeseed field (Exp. No. 24) was somewhat inferior to the average of the *táluka*. He decided to test a field of the Dohad Kasba, the lands of which are put in the first class and have been somewhat highly assessed. There was only one field growing rapeseed by itself and he selected it for his test. The field has brown red soil and always grows maize followed by rapeseed. It was manured with about 14 carts for the first crop. In the present year the occupant attempted to grow rice on a small part of the field, but the result has not been reported. The *sarsav* seed was mixed as usual with a quantity of finely powdered manure and then drilled through a tube attached to the plough. About 4 $\frac{1}{2}$ lbs. seed per acre was used. The outturn came to 501 lbs. of seed and 927 lbs. by-product per acre, together worth Rs. 23-11-10. The incidence is 4.38 per cent.

Mr. Bharucha's first wheat test (No. 25) was taken on a field with brown black soil, *berangi*. It grows maize as a kharif crop and wheat or gram and

rapeseed as rabi. It got no manure for the last five years, 50 carts being applied before that. The second wheat field (Exp. No. 26) has deep black soil. It apparently grows wheat alone every year; but this is not clear. *San* (hemp) was sown this year in the kharif season and ploughed in to serve as manure. The rains ceased early and there was little moisture for the proper development of the crop. The cultivation is described as indifferent in all the tests, but no details are furnished. The wheat seed-rates are both high.

The outturn results were :—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		Principal Product.	By-product.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
First field (Exp. No. 25) ...	6	431	533	15 9 0	2 8 0	16.06
Second field (Exp. No. 26) ...	6	906	884	41 4 8	1 0 0	2.42

Broach.

Experiments on an extensive scale to gauge the burden of the present assessment similar to those carried out in the Surat District during 1895-96 were intended to be carried out in this district during 1896-97. Owing, however, to the unfavourable character of the season they were postponed for a year. Arrangements were accordingly made to carry them out in the season of 1897-98. But owing to paucity of officers the programme has only been partially worked out. Messrs. Painter and Sorábsháh were asked to do six experiments each. Mr. Sorábsháh followed the programme; but Mr. Painter could not take tests on rice and cotton, as the former crop had been reaped before he was able to select a field for experiment and the latter crop was quite poor in his charge. He could not also do a second test in *jowár*, as no other field was available in the vicinity of his camp.

Mr. Mehta of the Gujarát Revenue Survey contributed only two experiments on *láng*, as besides testing the work of his own parties he had to supervise the work of Mr. Sáthe's parties also.

Mr. Mollison, Deputy Director of Agriculture, was able to carry out 19 experiments in all in the Ankleshvar and Broach talukas.

Mr. H. L. Painter, Assistant Collector,

Forwards four experiments; one each on *jowár*, *láng*, gram and wheat.

Fuller details might have been given. The fields have each black soil and are each reported to be manured every alternate year with 20 carts of cowdung per acre. This may be doubted. Season is stated to be only fair for *jowár* and *láng* good for wheat and gram. The outturn results, however, show that except perhaps *láng* no other crop yielded well. All the fields are apparently capable of growing the ordinary crops taken on deep black cotton soil, viz., mixed cotton and rice, *jowár*, wheat and *láng*, the crop grown in any particular year being perhaps determined to some extent by the character of the season.

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.	Remarks.
		Principal Product.	By-product.				
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.		
First field (Exp. No. 27) ...	5	324	230	14 2 1	6 0 11	42.60	<i>Jowár</i> .
Second field (Exp. No. 28) ...	4	800	600	21 2 2	6 1 0	28.74	<i>Láng</i> .
Third field (Exp. No. 29) ...	5	263	100	12 13 0	4 10 0	36.09	Gram.
Fourth field (Exp. No. 30) ...	6	356	316	19 6 3	6 0 8	31.03	Wheat.

The *lóng* crop is underestimated at 4 annas. The outturn represents a fairly good crop. The fields are all heavily assessed and the incidence is high in consequence. Gram and wheat have been priced very high. If calculated at ordinary rates the incidence would be still higher.

Mr. Sorábsháh Hormasji, District Deputy Collector,

Forwards six experiments ; two each on sesamum, wheat and *jowár*.

The fields selected were in each case average ones of the localities concerned. The season is reported to be favourable throughout. But this cannot be accepted as a correct estimate. It may have been moderately good for sesamum, the subject of the first two tests. The abnormal cyclonic rainfall of February helped to bring wheat and *jowár* (the other crops tested) to maturity ; but on the whole the season cannot be called favourable, especially in the case of *jowár*. The experimenter's anna estimates are throughout pitched too high, especially so as regards sesamum and *jowár*.

The soil of the first sesamum field (Exp. No. 31) is black, that of the second (Exp. No. 32) has a little *kankar* mixed with it. In the previous year *jowár* was grown in the first field, wheat in the other. Cotton in both fields preceded these crops for two years. Both fields were about equally manured with about 11 to 12 carts of farm-yard manure this year. Rains were favourable in the first case. Later rains deficient in the second. Each field was carefully cultivated, 6 ploughings to first and 8 to the second. Cotton in the second field was sown thrice ; but the seedlings were destroyed by excessive rain and so sesamum was sown at last. The *tal* would have been improved by one good shower late in the season, but the crop did not get this advantage. In each field the seed-rate was 1 lb. per acre.

The outturn results were :—

		Anna Estimate.	Outturn of Seed per Acre.	Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		As.	Lbs.	Rs. a. p.	Rs. a. p.	
First field (Exp. No. 31) ...	...	16	341	20 12 0	4 13 10	23.44
Second field (Exp. No. 32)	...	12	205	12 8 0	4 1 6	32.75

The wheat (Exp. Nos. 33 and 34) was raised on *basri* soils, *i.e.*, neither quite black nor sandy. Cotton and wheat is the usual rotation. No manure was applied in the first case ; about 8 cart-loads in the second. The first field, however, got last year 15 carts of farm manure and about 5,000 sheep were folded thereon for 3 nights. Both fields were ploughed 5 times. Season was generally favourable in both.

The outturn results were :—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		Principal Product.	By-product.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
First field (Exp. No. 33) ...	15	406	410	26 0 2	3 8 11	13.67
Second field (Exp. No. 34)...	12	378	395	24 4 10	4 5 5	17.84

The grain has been valued very high at Rs. 2-6 per *maund* of 41 lbs., *i.e.*, about 17½ lbs. per rupee. The experimenter reports that the price went down considerably subsequently.

The two *jowár* fields (Exp. Nos. 35 and 36) had black soil. Both grow cotton alternately with wheat or *jowár*. The first field was manured with about

20 carts of farm-yard manure per acre. The second has had none for the last five years. Both the fields were ploughed 4 times and well looked after. Rainfall, &c., was favourable, but the plants did not grow vigorously. They were considerably helped by abnormal rain in February.

The outturn results were:—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		Principal Product.	By-product.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
First field (Exp. No. 35) ...	18	894	1,770	30 14 11	5 2 0	16.58
Second field (Exp. No. 36) ...	15	619	1,775	22 9 7	4 5 6	19.23

The *jowár* grain has been valued at $32\frac{4}{5}$ lbs. per rupee. It is reported that its price fell subsequently to $38\frac{3}{5}$ lbs. a rupee. The *kadbi* in the second field was of superior quality and has been priced at a slightly higher rate.

Mr. P. R. Mehta, Assistant Superintendent, Gujarat Revenue Survey,

Forwards two tests on *láng* and reports the crop to be generally cultivated on black-soil fields in the Vágra, A'mod and Broach talukas of this district. It is never cultivated in the *mália* or superior *gorat* soil prevalent in Jambusar. The crop is reported valuable in outturn. Its yield varies from about 1,300 lbs. to about 150 lbs. per acre. The experimenter states that 800 lbs. may be regarded as the average crop in Vágra and 1,000 lbs. in A'mod and Broach. It does not grow well about Báhara villages. Its greatest enemy is an insect which develops during the cloudy weather in January. This year the crop at first gave promise of unusual success, but the insects attacked it in January and damaged it considerably; so much so, that in some villages it had to be fed to cattle. The by-product is very valuable as fodder for cattle. It is sold at 160 lbs. per rupee or less when fodder is scarce.

The test crops (Exp. Nos. 37 and 38) were grown on black-soil fields which usually grow cotton in rotation with this pulse. Wheat is occasionally taken as also rice, which was sown mixed with last year's cotton in the second field. No manure is used, at least none was applied to the *láng*. The tillage is reported to be fair.

The outturn results were:—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		Principal Product.	By-product.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
First field (Exp. No. 37) ...	10	496	1,044	20 2 8	4 8 7	22.49
Second field (Exp. No. 38)...	5	258	820	13 0 6	4 7 5	34.25

The by-product is valued at Rs. 9-9 per acre in the first case and at Rs. 7-8 in the second. In each case the weight of by-product represents that got from a good crop. The inference is that the legumes were affected to a considerable extent by the insects referred to and the weight of pulse per acre very considerably reduced. The local anna estimate of the first crop is pitched too high. The incidence is high, but *láng* may be considered a fallow crop and an excellent preparation for next year's cotton.

Mr. J. W. Mollison, Deputy Director of Agriculture,

Carried out 19 experiments in all in the Broach and Ankleshvar talukas of this district. Of these 2 are on *láng*, 5 on wheat and cotton each, and 7 on *Shiálu jowár*.

Láng is a difficult crop to test. It is reaped before it is dead ripe, formed into small heaps in the field, allowed to dry for a week, then it is turned and after a few more days' exposure is ready for threshing. Mr. Mollison intended taking a good many tests on *láng*, but found that he could make no satisfactory arrangements for watching the produce whilst the crop was drying and therefore confined his experiments to two crops only. The first of these represents a full average crop for the district, the second about $\frac{3}{4}$ of average.

The crop had been sown this year over a wide area, particularly in the Broach taluka, and almost without exception every field appeared on casual inspection very promising. But although in almost all fields there was a full plant completely shading the surface, insects had done considerable damage to the pods in many fields, the pulse being eaten up largely by the larvæ. It is difficult to say what proportion of the fields was thus affected. No harm had been done to the fodder, and the damage to a crop could only be detected by close inspection.

The first field (Exp. No. 39) selected for experiment is reported to grow *láng* better than any other crop, because it lies low and gets swamped during heavy rainfall. The field, however, grew cotton mixed with rice in 1895 and *jowár* in 1896. So that it appears to be cropped in accordance with the usual rotation of the district. It was manured with about 6 carts per acre of farm-yard manure. It was ploughed 4 times and harrowed 4 times. The crop completely shaded the ground and there were no weeds. It was affected by insects only to a trifling extent. In a well-grown crop with even germination and a full plant, the weight of pulse per acre should be about equal to the weight of *gotar* (*Bhusa* fodder), if the crop is threshed under the feet of bullocks in the ordinary way. The crop tested did not quite reach this standard. The second field (Exp. No. 40) which was not manured, but had received equal attention, did not yield as well as the first field did. This was almost entirely owing to the pods having been eaten into by larvæ. To a casual observer both fields looked almost equally promising and it will be noticed that there is no great difference in the actual outturn of fodder. This fodder is considered to have high nutritive value and in ordinary seasons it is readily saleable at about 120 to 160 lbs. per rupee. It is reserved specially as food for work cattle during busy seasons.

The outturn results were :—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		Principal Product.	By-product.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
First field (Exp. No. 39) ...	14 to 15	1,068	1,220	40 13 0	6 1 10	1·38
Second field (Exp. No. 40)...	10	610	1,100	25 12 4	5 3 2	20·17

If the character of the season this year was about average, then the value of the *láng* and other crops grown in the village of experiment and in a large stretch of black soil in the same tract indicates that the burden of assessment is not high. Besides, *láng* is a very good preparation for cotton. The *láng* fields when cleared, if they have been properly tilled before sowing, are when the crop is removed as clean as fallow fields. The thick close mass of crop smothers surface weeds and very little preparation is required for the succeeding cotton.

The occupant of the first field is a Musalman and cultivates in all 40 acres. He has only one pair of bullocks, one buffalo and a pony. He hires cattle for tillage in busy times and has a servant who is paid Rs. 2-8 per month with food, clothes, &c. Wages are higher in this village (Chamargám) than in villages away from the railway, because of the demand for labour in ginning factories and for railway work. The owner of the second field is also a Musalman. He occupies in all 29 $\frac{3}{4}$ acres. He has two bullocks and one milk buffalo. The father, son and one servant do all the work assisted at times by the women of the household.

Although many of the cultivators of the village are Musalmans, the cultivation does not suffer. A considerable proportion of the culturable area was in bare fallow (*vdshil*), a practice very general throughout the black soils of Broach. The process of fallowing is usually well done and that in this village was no exception.

Of the five wheat experiments, three were taken at Hānsot and two at Utraj, both in the Ankleshvar táluka. The soil is black throughout and season favourable, the rainfall in February having helped to bring the crop to full maturity and fill the grain well.

The first field at Hānsot (Exp. No. 41) got no manure during the last seven years, but the outturn does not seem to have been unfavourably affected thereby, because the field had been waste or under grass before that period. The experimenter found in a good many instances throughout the district that fields which grew specially good crops, had, at some more or less recent period, been under grass. The rest thus given has unquestionably a recuperative effect on the soil's fertility and there was evidence that the fertility thus acquired was not soon exhausted. The crop represented a full crop in a good season on good black soil. There were a few crops in specially good situations better than that of this experiment, but few, if any, fields better on ordinary black cotton soil.

The second wheat experiment (No. 42) was taken on a crop which may be considered full average for ordinary black cotton soil in an average season; the cultivation was not up to the highest standard but as good as average. The field is sublet to a Mahomedan by the Váni owner at Rs. 12 per acre, the superior holder paying the assessment. This is the general rent throughout the Ankleshvar táluka for average black-soil. The rent may, for good fields favourably situated, be as high as Rs. 14 per acre or as low as Rs. 10 if the field is remote from the village or inferior in quality of soil. The test field was about a mile from the village. It will be noticed that the amount of fodder got from a wheat crop is small. In trampling out the crop under the feet of bullocks and subsequently winnowing, a good deal of light dust is carried away, and by weighing the grain and straw together before threshing, and the chaff and grain after threshing, the loss percentage was found to be considerable and varied with the strength of the wind. If winnowing was done in the afternoon with a strong wind, a good deal was carried away which was not subsequently collected.

The third wheat test (No. 43) was taken on a crop which was perhaps slightly under average for good black soil in an average year. The field had not been manured for four years. It appeared, however, clean and gave evidence of careful cultivation. The cultivator is a Koli. He and the superior holder are partners. The owner gets half the produce and as much more as represents half the assessment. He pays the whole assessment to Government, and the tenant meets all costs of cultivation. The Koli cultivates about 15 acres in all, parts of which being *bágúyat* are rented as high as Rs. 26 per acre.

The fourth wheat field (Exp. No. 44) lies at a considerable distance from the village, but the crop did not indicate that the cultivation suffered owing to its outlying position. The crop was full average for the village this year and probably full average for good black soil in the district in a favourable season. There were a large number of fields under wheat in the village. Some were superior to the field tested; the majority were not so good.

The last wheat experiment (No. 45) was taken on a crop which is considered poor. The germination was, however, regular and the whole area covered with crop. This would not be the case in an unfavourable season. It very often happens that although the main portion of a field has a fairly full plant, there are patches, particularly on the borders or headlands, where there is deficiency in this respect, and the actual outturn is difficult to gauge by test areas. This year the wheat fields throughout the district did not exhibit the same degree of patchiness which they do in some years.

The field tested is rented by a Bráhmaṇ cultivator at Rs. 10 per acre. He cultivates in all 17 acres. The only cattle he owns are three bullocks and it is difficult to believe that he could afford to give the quantity of manure which

was reported (20 carts per acre), because he must necessarily have bought it, or the greater portion of it, the current rate, being 8 annas per cart-load. The Bráhmaṇ hires one servant during the rains for tillage operations, giving rupee one for six days' labour.

The outturn results were :—

	Anna Estimate	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		Principal Product.	By-product.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
First field (Exp. No. 41) ...	16	881	931	44 6 10	4 13 7	10·31
Second field (Exp. No. 42)...	14	500	410	24 11 6	5 7 2	22·04
Third field (Exp. No. 43) ...	11 to 12	380	335	18 14 2	5 12 0	30·44
Fourth field (Exp. No. 44)...	14	510	260	24 8 10	3 11 11	15·25
Fifth field (Exp. No. 45) ...	9 to 10	265	255	13 4 2	4 4 10	32·44

The anna estimates seem high in each case and the incidence is high in Nos. 3 and 5 owing to poor outturn.

Mr. Mollison's five cotton experiments were confined to two villages in the Broach taluka. He explains that throughout the Broach and Ankleshvar talukas the cotton crops this year varied considerably. Many fields were considerably under average. The general practice, particularly in the Broach taluka, is to grow cotton and rice mixed, and as the rice was reaped long before the cotton experiments were begun, it was impossible to estimate, with any degree of certainty, how good or how bad that crop had been in the different fields. He thinks that there can be no doubt that the mixed crop outturn of cotton and rice in the Broach taluka was this year in a much more satisfactory position than in Ankleshvar. This was in a great measure due to the character of the season. Sowing was everywhere delayed until July. In Ankleshvar even these late sowings were destroyed by heavy rain, whereas many fields in Broach escaped this disaster, and as the season was subsequently favourable throughout the taluka, this crop was probably up to the average standard.

Cotton is picked at short intervals in Broach and the picking season extends over two months. Under the circumstances, it was impossible to personally supervise more than a few experiments and test other crops at the same time. So only five cotton fields in two villages were selected. The crops on an average were considerably better than those in the Ankleshvar taluka this year. The experimenter had seen the Broach and Ankleshvar talukas along the railway during several former seasons and thinks that the crops selected were no better than those which would represent, in an average year, good, medium and indifferent cultivation.

The practice of growing rice and cotton mixed, safeguards the cultivators to a considerable extent. Cotton seedlings are liable more or less to be damaged or destroyed by heavy downpours of rain early in the season on land so retentive as the deep black soil of Broach. Rice would probably flourish under similar conditions. The owners of the fields experimented upon, admitted having reaped a fairly good crop of rice subordinate to the cotton, and in most fields throughout the district the stubble indicated a regular plant of rice. An average outturn of rice subordinate to cotton in a good field was estimated by many cultivators at 3 or 4 maunds per *bigha*, i.e., about 240 to 320 lbs. per acre. The value of this outturn would be about Rs. 7 to 10 per acre. If in addition to the rice there is a full or fairly regular plant of cotton, the outturn from that crop will in all probability be just as great as if the crop had been grown alone. In, however, gauging the burden of assessment, it has to be remembered that the practice of

fallowing is common in the district, and that, on an average, perhaps one-fourth of the holding of a good cultivator is fallowed every year. In the majority of cases such land is literally bare fallowed. The field produces nothing but is subject to expensive tillage every month for a whole year, the land being kept continuously stirred to destroy weeds and all vegetation. The practice is occasionally varied by growing two rows of *jowár* or *tur* with a wide interval between these rows and the next pair. The interval may be 20 feet more or less. The rows of crop do not materially interfere with the fallowing process and give some outturn to help to repay expenses.

In Chamárgám, where two of the cotton fields (Exp. Nos. 46 and 47) were selected, the majority of the cultivators, as already stated, are Mahomedans, and the general style of cultivation is decidedly superior. The fields and crops had a trim, well cultivated appearance, which ordinarily is found only with Kunbis and such other castes as are recognized good cultivators. The cotton was nearly in all fields a good crop and the fields tested were not over average for the village. Each crop was grown after a year's fallow and in each field rice was subordinate to the cotton. The rice was not tested but has been assumed to produce sufficient to pay the assessment. The occupant of each field declared that manure had been applied but there were no signs of any recent application. The owner of the first field has no cattle and that of the second has only one bullock. Any manure applied must necessarily have been bought for the first field; and as the owner of the second field cultivates in all 14 acres, the amount of home-made manure available per acre would be very trifling. The system of fallowing largely takes the place of manuring and there is no doubt that it recuperates the fertility of deep black cotton soil in Broach to a very considerable extent. The fields were clean. Each crop had been bullock-hoed several times and also hand-weeded. In the first field, cotton and rice apparently alternate with fallow, whilst in the second field more systematic rotation has been practised. *Láng* in 1894 was followed by *tur* and *tal* in 1895 and fallow in 1896. This is a capital sequence of crops and a good preparation for cotton. Both fields were picked 6 times: the first picking on the 11th February and the last on the 10th April. The fields were watched night and day.

The outturn results worked out as under:—

	Anna Estimate.	Outturn of Seed Cotton per Acre.	Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
	As.	Lbs.	Rs. a. p.	Rs. a. p.	
First field (Exp. No. 46) ...	10 to 11	334	22 14 9	5 2 11	22·60
Second field (Exp. No. 47) ...	14	446	30 9 8	5 7 0	17·76

The other three fields were selected at Kisnád. Each had subordinate rice, which was not tested. The crops in the village were not so uniformly good as in Chamárgám.

The first field (Exp. No. 48) may be taken as representing a poor crop and inferior cultivation. The owner is a Pátidár. The field is somewhat distant from the village and is sublet to a Koli. He gives, as rent to the Pátidár, half the produce and as much more as equals half the assessment in value. The occupant has only one bullock and had applied no manure for the past eight years. *Tal* in 1894 was followed by cotton in 1895 and fallow with rows of *jowár* in 1896. The fallowing must have been imperfectly attended to, as the field was weedy with every appearance of careless cultivation.

The second field (Exp. No. 49) is owned and cultivated by a Pátidár. It was in grass for some years prior to 1895, and the crop tested is the second crop taken since. No manure had been given and none was required. Waste land, when broken up, can stand cropping without manure for several years. In 1895 the field was broken up and cleaned by fallowing; wheat was grown in 1896.

The third field (Exp. No. 50) is owned by a Girásia but is cultivated by a Pátidár. The Girásia mortgaged to the Pátidár $5\frac{1}{2}$ *bighas* of the number for Rs. 550 and the use of this land is taken in lieu of interest. The cultivator pays the assessment. About 7 acres of the same survey number is rented from the Girásia by the same Pátidár at Rs. 12 per acre. The Girásia pays the Government assessment. During the last four years, cotton and rice has been taken in alternate years with fallow. The rice stubble in the field indicated that the crop had been good. The cotton rows were 3 feet apart. The rice had been sown in the cotton rows and also alone in an intermediate row. The Pátidár when questioned as to how he safeguarded himself, if the owner wished to resume possession after a year of fallow, indicated that the Girásia was unable to repay the amount advanced on mortgage and if he could find the money he could not resume possession of the land except at the end of a year when a crop had been taken. The field had been manured by folding sheep, also with farm-yard manure, but the latter statement is not believed. The experimenter thinks that if count is taken of the rice produce, which, judging by the stubble, was better than in most fields, the outturn of rice and cotton represents a full average crop. The cotton appeared to be a good level crop, but the rows were wider apart than in a majority of fields and the cotton outturn was reduced accordingly.

The crops were picked 5 times: 1st picking on 7th February, last on 21st March.

		Anna Estimate	Outturn of Seed Cotton per Acre.	Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assess- ment.
		As.	Lbs.	Rs. a. p.	Rs. a. p.	
First field (Exp. No. 48)...	...	8	265	18 2 11	5 3 7	28.81
Second field (Exp. No. 49)	...	14	400	27 7 2	5 6 10	19.77
Third field (Exp. No. 50)	...	12	378	25 15 0	5 10 0	21.68

The high incidence in the first field is explained by the indifferent character of cultivation. In the other experiments it is not unduly high; and this is borne out by the amount of rent in produce or cash which the cultivating tenant pays to a superior holder. The value of the subordinate rice may be considered a set-off against the advantage which these fields get from the practice of fallowing which is so common in the district.

The *jowár* crop of the district is largely rabi and in the two *tálukas* of Broach and Ankleshvar, where Mr. Mollison's experiments were made, only one variety, *Shiálu*, is in general cultivation. In some villages in Ankleshvar in a few fields a mixture of varieties were sown, inadvertently however, as owing to scarcity in the previous year, some cultivators had to purchase seed from the Baniás particularly for second sowings. Several sowings were the rule rather than the exception in 1897-98 and owing to heavy rain late in September and in October, sowing operations were belated. Many late sown crops germinated very irregularly. The proportion of poor late sown crops was greater in some villages than in others. In January the crops looked extremely unpromising in many fields. In the two *tálukas* as a whole probably half the area sown promised to yield a very poor outturn of grain and not a great deal of fodder, the fields having a very irregular plant and patchy appearance. Heavy abnormal rain, however, fell in February and the late sown *jowár* improved in a remarkable manner. The plants tillered out well. The central shoots produced large heads of grain and there was now sufficient moisture in the soil to ripen the later side shoots. Such crops did not fully ripen until the middle of April or about two months after the average time of harvest. Mr. Mollison selected several of these late fields for experiment but owing to illness was unable to test the crops. All experiments were taken on earlier sown crops which had germinated regularly.

The two fields (Exp. Nos. 51 and 52) which were in Derol, a village about 8 miles north of Broach, represent, for good deep black soil in an average year, the first field a full average crop and the second somewhat below that standard. The character of the season in this and many surrounding villages was only middling. A good many fields in this tract produced better crops than either of the fields tested, but there were numerous fields which, owing to late sowings and irregular germination, did not yield nearly so well.

The owner of the first field, Rajput by caste, owns in all about 40 acres. He with his two brothers and a hired man work the holding. He has four work-bullocks and two milk buffaloes. The portion of the number which was tested for *jowár*, was last year fallowed. It grew cotton the year before. No manure has been applied during the last three years. The field was clean and carefully cultivated. The *jowár* was drilled in October, 6 lbs. seed per acre. The crop was ripe in March.

The second field grew *láng* in 1895-96 and *tal* in 1896-97. The tested crop was clean and bore evidence of careful cultivation. The land was ploughed once and repeatedly harrowed between June and September. No manure has been applied for many years. It was asserted that this field, as well as some others in the village, would not grow cotton properly. The crop when tried became diseased. Throughout the whole of Broach and Surat the disease referred to affects in almost all fields a plant here and there. The diseased plants catch the eye readily owing to the pale crumbled up and mildewed appearance of the leaves.

The occupant is a Rajput. He does not work much himself. He has three hired servants who are paid Rs. 2 per month with food and clothes. The Rajput cultivates in all 62 acres. He has 3 bullocks, 1 cow, 1 calf and 1 milk buffalo. The field was sown in October. Ten pounds seed per acre was sown. It, like the first field, had been bullock-hoed three times and the plants thinned out when about a foot high. The plants were left further apart in the first field. Consequently the heads of grain were bigger than in the second. But the second field gave a larger number of bundles of *kadbi*. North of the Narbada, within a reasonable distance of Broach, *kadbi* is worth a good deal more than in villages south of the river.

The outturn, &c., results of the two fields were as under :—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		Principal Product.	By-product.			
	As.	Lbs.	Bundles.	Rs. a. p.	Rs. a. p.	
First field (Exp. No. 51) ...	12	1,199	476	47 1 6	5 10 11	12·06
Second field (Exp. No. 52)...	10	925	615	41 4 0	5 15 2	14·42

The incidence is very moderate. The next three experiments on *jowár* were taken in outlying fields in Kapodra, a village of Ankleshvar táluka. The soil in these fields, as indeed throughout considerable areas in the Ankleshvar táluka, is not deep black cotton soil proper, but contains a considerable admixture of lime and is comparatively shallow. The surface undulates a good deal and in parts is broken. There the soil is still worse and this year produced very poor crops of *jowár* and cotton.

The occupant of the first field (Exp. No. 53), a Mahomedan, owed a Sáykár of Ankleshvar Rs. 400. The Sáykár took this field and another field in another village. The area of the second field was not ascertained. The tenant now pays Government assessment and in addition a rent of Rs. 30 per annum for both fields. The occupant did not appear to know his own position. The crop had a regular plant. The field was clean and carefully cultivated. Cotton had been grown in 1895-96 and *jowár* in 1896-97. The abnormal February rain was very beneficial to bring the later formed heads of grain fully to maturity.

The seed was sown by drill, 6 lbs. per acre, in the beginning of November, *i. e.*, a full month later than usual. The crop was hand-weeded twice and bullock-hoed once. No manure applied during the last five or six years.

The owner of the second field (Exp. No. 54) is a Mahomedan boy about 12 years of age. He owns and cultivates in all about 75 acres, has 8 bullocks, 4 milk buffaloes and 1 calf. He has three servants, who are paid Rs. 12 each per year with clothing and three meals per day. The field tested is Ját Inám. It was twice ploughed and harrowed thrice before sowing; subsequently hand-weeded twice and bullock-hoed once. Manure had been applied in 1896, 10 loads per acre. In that year *tal* was grown and *jowar* the year before.

The third field (Exp. No. 55) belongs to a Musalman and is cultivated by a Koli. The Koli gives half the produce and as much more as is equal in value to half the assessment. The appearance of the crop and field showed that the cultivation had been fairly careful. Manure was applied last three years ago. The crop was sown in November; 7 lbs. per acre seed was drilled.

Outturn, &c., results were as under:—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		Principal Product.	By-product.			
	As.	Lbs.	Bundles.	Rs. a. p.	Rs. a. p.	
First field (Exp. No. 53) ...	8	461	514	19 3 1	3 3 6	16·77
Second field (Exp. No. 54)...	10	660	660	26 11 6	3 6 5	12·72 ~~1~~
Third field (Exp. No. 55) ...	10	623	520	24 3 1	3 3 3	13·24

The next two experiments were made in Umarwáda. There were a good many fields in this village quite as good as those selected. The best crops were on the higher level fields. The soil in these higher fields is not pure black. It has a considerable admixture of sand and lime. The lower lying fields with deeper better soil had comparatively poor patchy crops, this of course being entirely owing to the character of the season.

The first field (Exp. No. 56) originally belonged to a Musalman who got into the debt of an Ankleshvar Váni and had to relinquish his field. The Váni rents the field to a Káchia. The Káchia pays Rs. 20 for 4 acres 14 gunthas, the assessment being Rs. 14·8. The Váni pays the assessment; thus his profit is only Rs. 5·8. That was the statement made by the tenant and repeated by the Váni, but neither statement could be believed. Seed was drilled in November, 10 lbs. per acre. The explanation offered as regards the small rent paid was, that the land was in very bad order when the Káchia first rented it, but the land is in good condition now and has been in the Káchia's occupation for some years and he could very well afford to pay a higher rent, and Mr. Mollison thinks that there can be little doubt that he does.

The Káchia has no work cattle. He hires as required. He said he manured the field with 20 loads per acre of manure bought in Ankleshvar at 2 loads per rupee. The field is some 4 miles from Ankleshvar, so that for manure and cartage an outlay of some Rs. 80 must have been incurred. This is impossible to believe. The field grew *jowar* in 1894-95, *tal* in 1895-96 and cotton in 1896-97.

The second field tested (No. 57) has similar soil. It grew *jowar* in 1895-96 and *tal* in 1896-97. The field had been manured for the *tal*. The crop was sown in November, 10 lbs. seed per acre. The land had been previously twice ploughed and twice harrowed. The crop was bullock-hoed but not hand-weeded. The land was clean.

Outturn, &c., results from both fields were as under :—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage. Incidence of Assessment.
		Principal Product.	By-product.			
	As.	Lbs.	Bundles.	Rs. a. p.	Rs. a. p.	
First field (Exp. No. 56) ...	14	925	490	33 13 7	3 5 4	9·84
Second field (Exp. No. 57)...	14	868	471	31 12 7	3 1 0	9·63

The experimenter believes that the anna estimates are pitched a bit too high.

Surat.

No experiments have been reported from this district, as owing to the prevalence of the plague the district officers were able to conduct none.

Tha'na.

Experiments on *rāgi* and sugarcane were ordered to be made in the Bassein sub-division, on *rāgi* and gram in the Kalyán sub-division and an ordinary test on rice and a special experiment on a holding of about 2 acres growing a number of garden crops in the Mahim sub-division. Mr. Hudson could not find a suitable *rāgi* field and chose *san* instead. Sugarcane was not ready before he left the district, but his successor should have carried out an experiment on that crop. Mr. Shepherd did a test on *rāgi*. His successor was unable to test gram owing to illness. Mr. Nábar did the rice experiment. He, however, pointed out difficulties in connection with the special experiment which had in consequence to be postponed. Later he tested sugarcane and had arranged for testing other crops of the holding selected, but had to give up the experiments owing to plague duties.

Messrs. Wilkins and Sáthe of the Konkan Revenue Survey carried out tests on wheat, castors and gram in the Umbargáon petha of the Dáhánu taluka where they were working.

Mr. C. W. M. Hudson, Assistant Collector,

Forwards a test (No. 58) on *san*, hemp, *Crotolaria juncea*. He explains that in all villages near the coast where there are fishermen, *tág* or *san* is cultivated. The plant does not seed well on the coast. The seed is always imported for sowing. The seed should be sown thickly, so that straight tall stems without branches are produced. Such yield the best fibre. The plants in a good crop stand close together, completely shade the ground and suppress weeds. *San* is everywhere recognized as a good crop to grow on weedy land, either as a green manure crop or as a crop grown for fibre. It belongs to the natural order Leguminosæ and is therefore a good rotation crop with rice or any cereal. The tenure is *ardheli*. The fisherman supplies the seed, the cultivator provides land and ploughs it, and gets $1\frac{1}{2}$ anna per 4 *sers* of seed sown for his trouble. The fisherman pulls up the plants, spreads them to dry, and ties them in bundles when ready for sale. The cultivator and the fisherman then share the bundles equally.

In the test field the land was ploughed once before sowing. About 16 *pailis* (64 *sers*) of seed is required for sowing for an acre. This is for good soils. Poor soils require less. After sowing the land is ploughed across and then pressed with a log to level the surface.

The test crop was uprooted and spread out to dry for about a week and then tied into bundles. It required further drying for about four days, but the experimenter could not wait till that period. The bundles have not been weighed, but were valued by Panch at 7 annas per bundle. This gives an acre rate of

55 bundles worth Rs. 24-1. The crop was not considered good. In good crops on good land a bundle would be worth more than double the above price. The stems when thoroughly dry are soaked in any dirty water for a week. The root end is then broken off and the fibre comes off easily in one piece with a little skilful handling.

Mr. W. C. Shepherd, Assistant Collector,

Submits a test (No. 59) on *nágli*. The crop is grown to a limited extent in the Kalyán taluka where the experiment was taken. The experimenter says "it requires high ground where water cannot accumulate and needs a good rainfall, which should not be incessant but showering". The crop was average for the season. The field selected had first class *varkas* soil. It grows (1) *nágli*, (2) *vari* and (3) *khurásni* or niger seed after two years of fallow or *nágli* alone is taken after leaving the land vacant, every alternate year. The seed-bed was *rábed* as usual with cowdung, straw, earth and grass. The season was exceptionally good and the outturn came to 985 lbs. grain per acre. The by-product has not been valued, being regarded as useless. The money value of the grain comes to Rs. 24-3-10 and the incidence 2·14 per cent. The seed-rate reported by the experimenter, 23 *tolas* per acre, is not sufficient.

Mr. V. S. Nábar, District Deputy Collector,

Forwards one test (No. 60) on rice. The field was selected "as it was cultivated under the supervision of a careful man and as the field appeared to be in good order and carefully managed." This does not necessarily mean an average condition of things and the experimenter does not state if the crop represented an average crop of the locality.

The field is *khariif nimgarwa* and grows the same crop, *Dodka* rice, every year. No manure is ever used for the field. The seed-bed, however, was *rábed* as usual. Three gunthas of bed furnished seedlings sufficient to plant over an acre of field, and 6 cart-loads of cowdung and 3 of grass were used on this bed. The season was excellent and tillage careful. 56 lbs. of seed were used per acre. The yield came to 2,379 lbs. grain and 2,470 lbs. straw per acre, together worth Rs. 65-4-1. The incidence comes to 9·51 per cent.

Mr. W. D. Wilkins, Assistant Superintendent, Konkan Revenue Survey,

Submits a test (No. 61) on wheat grown in the Dáhánu taluka. The crop is grown to a very limited extent in the taluka and nowhere else in the district. The test field has black soil and grows wheat alternately with castors. No manure was applied, but hemp (*san*) was sown early in the season at the rate of 86 lbs. of seed per acre worth about Rs. 2-8. The crop was not ploughed in but removed when ripe. It is a good rotation crop and the crop residues left as roots, fallen leaves, &c., probably helped the wheat which succeeded it. The wheat was drilled at end of October at the rate of 70 lbs. to an acre. The crop was ripe at middle of March and produced 816 lbs. grain and 920 lbs. by-product per acre, together worth Rs. 55. The grain has been valued at an extremely high rate of 15½ lbs. per rupee. The incidence works out to 9·43 per cent. This is exclusive of the hemp produce. The field has been rented to a tenant, who retains ¾rds of the produce and hands over one-third to the occupant, who pays the assessment.

Mr. H. V. Sáthe, Assistant Superintendent, Konkan Revenue Survey,

Submits five tests; three on castor seed and two on gram, from Dáhánu taluka.

Two of the castor-seed fields (Exp. Nos. 62 and 63) have brownish black soil and were classed as *varkas* at the original survey, but being level and having full depth of soil both the fields have been classed as *rabi* in the revision survey. They are partly cultivated and partly under grass. Annually ½th of the first field and ½ of the second field was cultivated. The grass is used for the fodder and *ráb* purposes. Castor is usually the first crop. It is followed by *kodra* and the land is then allowed to lie at rest for about three years.

No manure is ever applied. Season and tillage both were good. The reported seed-rates are unnecessarily high.

The outturn results were :—

		Anna Estimate.	Outturn of Oilseed per Acre.	Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		As.	Lbs.	Rs. a. p.	Rs. a. p.	
First field (Exp. No. 62)	...	9	262	11 14 10	0 3 11	2.05
Second field (Exp. No. 63)	...	9	179	8 2 10	0 3 4	2.54

The oilseed has been priced rather high at 16 *sers* or about 22 lbs. per rupee. The second field has been rented by 12 sharers at $\frac{1}{3}$ rd the produce gathered.

One (Exp. No. 64) of the two gram experiments was taken on light black-soil field which lies low under a tank and is usually water-logged in the monsoon. It grows only one crop, rice, if the field is workable during the monsoon, or gram otherwise. The field was classed as *varkas* in the original survey and as *rabi* at revision. Only 1 acre 30 gunthas were sown with gram, the remainder 14 acres 10 gunthas being under grass. About 72 lbs. of seed sown per acre at end of October produced in about $4\frac{1}{2}$ months 732 lbs. of pulse valued, at the high rate of 7 *sers* or $12\frac{1}{2}$ lbs. per rupee, at Rs. 58-4-6. The yield is good, but the value of produce abnormally high. In an ordinary season the value of the crop would be less than half that reported.

The remaining two tests, one on gram and another on castors, were taken on rice fields growing second crops. The experimenter says that there are many rice fields in the *rānpatti* villages of the Umbargāon petha which are found to retain moisture sufficient to grow second crops and have been on that account classed for *Dusota* (i.e., capable of growing second crops) by the Survey Department, but in very few of them is a second crop grown. The experimenter reports that according to local belief a second crop after rice hardly pays the expense and labour of growing it, and the fields tested were the only fields growing second crops in his charge. There are many rice fields in the Thāna Collectorate that would grow second crops, but such are not grown because such crops would be difficult to protect from trespassing cattle without fencing. The cattle roam and graze at will in large numbers after the rice is reaped.

The area under experiment in the first case (No. 65) formed part of the village Pátils' service Inám land. It was somewhat high lying and had been burnt with *rāb* material to grow seedlings for the rice crop. In the second experiment (No. 66) the area formed part of a rice field belonging to a Pārsi gentleman from which rice had previously been reaped. Second crops are only occasionally grown on both the fields. Season was good but the tillage is considered indifferent in both. In what respects it was so is, however, not clear. Seed-rates are low compared with those reported above, as also is the outturn.

The results were :—

		Anna Estimate.	Outturn of Grain or Seed per Acre.	Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		As.	Lbs.	Rs. a. p.	Rs. a. p.	
First field (Exp. No. 65)	...	8	236	10 11 8	1 9 4	14.75
Second field (Exp. No. 66)	...	6	285	22 10 6	1 8 5	6.75

Prices, as above, were unusually high. The incidence is calculated on the value of the second crop alone.

CENTRAL DIVISION.

Kha'ndesh.

Each experimenter was directed to take two tests on *bájrí*, one on *jowári* and one on wheat. Mr. Hatch did only two tests on wheat, as the *bájrí* crops were all reaped before he returned from leave and he was called away to plague duty before he could complete a test on *jowári*. Mr. Varley tested only wheat, as the other crops in his charge were reaped this year somewhat earlier than usual and before the commencement of the touring season. Messrs. Shalom and Joshi followed the programme, though the reported results are not satisfactory for reasons noted further down. Mr. Sitáram Dámodar carried out no experiments, as he was "engaged in taking precautionary measures against plague." This reason is considered unsatisfactory by the Collector.

Mr. F. B. Young, Superintendent, Land Records and Agriculture, C. D., has forwarded four experiments from this district.

Mr. G. W. Hatch, Assistant Collector,

Submits two tests (Nos. 67 and 68) on dry-crop wheat, the varieties in each field being mixed *Bansi* and *Kátha*. The fields were quite close to each other and were within a few miles of the Tápti. Both had deep black cotton soil. The first field was not manured in the present season while the other is reported to have been manured at the rate of 20 to 25 cart-loads per acre. The first field grew wheat, coriander and cotton during the past three years, the last crop being only an eight-anna one. The second, like much of the deep black soil which borders the Tápti, grows wheat continuously. The previous year's crop was quite a failure. In the current season the wheat of the first field represents an average of the locality; that of the second field is said to be slightly above the average. The two varieties were sown mixed. Season was favourable and tillage fair.

The results are shown below :—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		Principal Product.	By-product			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
First field (Exp. No. 67) ...	14	490	460	21 4 0	3 6 1	15.90
Second field (Exp. No. 68) .	14	565	410	24 6 0	3 6 7	18.99

The experimenter forwarded only one sample *ser* for the two tests. The samples are required to test the correctness of the weights of measure *sers* recorded by experimenters. In the present case the sample forwarded weighed $156\frac{1}{2}$ *tolas* against 147 *tolas* recorded by the experimenter. This increase in weight cannot be accounted for, unless it is supposed that the experimenter forwarded something *more* than a *ser*; whereas the orders are to send the *exact* contents of a local *ser*.

Grain has been valued at a high rate. Prices are reported to have fallen considerably in about 10 days and subsequently risen to some extent.

Mr. F. J. Varley, Assistant Collector,

Forwards an experiment on wheat (No. 69) which is not satisfactory. The crop selected for experiment was poor, and as the field also grows *bájrí* and *math* the soil cannot be typical of that which is generally sown with wheat or gram or other rabi dry crop in Khándesh. The season is described as excellent, the

rainfall being the best known for several years both in its abundance and timeliness. The experimenter asked the Mámlatdár to choose the crop, who, it is explained, had some difficulty in finding an uncut crop, as the experiment was undertaken somewhat late. The field had a *nála* running through it and part of the *nála* was included in the test area. The field grew (1) wheat, (2) *bájri* and *math*, and (3) wheat during the past three seasons. It is manured only once in three years, but it is not stated when it was last manured. 62 lbs. of seed sown per acre in November produced on 1st March 188 lbs. of grain and 318 lbs. of chaff, together valued at Rs. 11-14-5. The grain has been valued very high at 17½ lbs. per rupee. The market rates were probably much lower later. The incidence is high.

Mr. Shálom Bápuji, District Deputy Collector,

Submits four experiments; two on *bájri*, one on *jowári* and one on irrigated wheat. The samples of measure *ser*s of grain forwarded by the experimenter when weighed in this office showed great differences between the weights actually found and those recorded by the experimenter:—

			Weight recorded by Experimenter.	Weight found in Director's Office.	Difference.
			<i>Tolas.</i>	<i>Tolas.</i>	<i>Tolas.</i>
First experiment	...	...	147	154½	+ 7½
Second experiment	...	...	142	153½	+ 11½
Third experiment	...	...	140	146½	+ 6½
Fourth experiment	...	...	141	152½	+ 11½

It is impossible to account for these over-weights unless the experimenter forwarded samples in excess of the exact contents of the local *ser* measure. If he used wrong weights there would be presumably proportionate differences between weights, which there is not. If the weights recorded are actually wrong, the outturn ought to be increased by about 5 per cent. in the first and third test and by about 8 per cent. in the second and fourth. The experiments are otherwise unsatisfactory. *Bájri* straw and chaff are valued at over 1,000 lbs. per rupee in the first test, and at nearly 1,300 lbs. per rupee in the second test, whilst *jowári kadbi* and chaff are valued at nearly 2,900 lbs. per rupee. In contrast to these exceedingly cheap rates, wheat chaff is valued at the dear rate of 170 lbs. per rupee. The *bájri* crop grew on light soils. In the first field *tíl* was the crop of the previous year and it was grown after three years' fallow or waste. The second field grew *jowári* and cotton in 1896, *bájri* in 1895 and *tíl* in 1894. Both the crops are said to have been sown very late in September. The tests were taken late in November. It is impossible that the crops could have properly matured in about two months. Rain is said to have been favourable to the first crop, not to the second, though both the fields were in the same village.

The outturn results were—

			OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
			Anna Estimate.				
				Principal Product.	By-product.		
			As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.
First field	...	...	12	549	2,254	24 15 6	0 10 0
Second field	...	...	10	337	1,696	15 13 0	0 7 5

The grain has been priced very high at about 24 lbs. per rupee. Prices must have fallen soon after.

The *jowári* crop tested yielded only 86 lbs. per acre of grain and 4,170 lbs. of useful by-product. The reported seed-rate is only 2 lbs. per acre. There is something radically wrong with weighments or reported figures in this experiment, because it is impossible to believe that 2 lbs. of seed could under any circumstances produce the weight of *kadbí* reported.

This officer's wheat test is more satisfactory. The field selected has good black soil with facilities for irrigation which enables the cultivator to grow second crops and also occasionally sugarcane. The last shows that the supply of water is plentiful. In 1896-97 gram followed a kharif crop of *til*. In 1895-96 wheat alone was raised; in 1894-95 the field was double-cropped with *bájri* and wheat; sugarcane preceded these crops. The experimenter does not state whether the present crop was preceded by any other crop in the kharif season. About ten carts of sheep dung are said to have been used per acre for manure. 57 lbs. of seed sufficed for an acre. The crop matured in about five months and yielded 1,582 lbs. grain and 855 lbs. chaff, together valued at Rs. 77-14-8. The grain is priced high at $21\frac{2}{3}$ lbs. per rupee. The incidence of assessment comes to 7.44 per cent. The assessment includes water charge of about Rs. 4-8 per acre. The number of waterings given to the crop have not been ascertained.

Mr. S. C. Joshi, District Deputy Collector,

Submits five tests; two on *bájri*, one on *jowári* and two on wheat. This officer's tests have the same faults as those noticed in Mr. Sháloṃ's case and criticised at length. The samples of measure *sers* showed the following discrepancies:—

		Weight recorded by Experimenter.	Weight actually found in Director's Office.	Difference.
		<i>Tolas.</i>	<i>Tolas.</i>	<i>Tolas.</i>
First experiment ...	...	141	147 $\frac{3}{4}$	+6 $\frac{3}{4}$
Second experiment ...	...	148	155	+7
Third experiment ...	...	128	132 $\frac{3}{4}$	+4 $\frac{3}{4}$
Fourth experiment ...	...	154	160 $\frac{3}{4}$	+6 $\frac{3}{4}$
Fifth experiment ...	...	147 $\frac{1}{2}$	152	+4 $\frac{1}{2}$

The differences are smaller than in Mr. Sháloṃ's tests. The by-products are again valued at variable rates, which, however, in the case of *bájri* are higher than they should be. Thus in the first test the *bájri* by-product is valued at 103 lbs. per rupee, in the second at 163 lbs. per rupee, whilst the *jowári kadbí* is valued at 499 lbs. per rupee. The *bájri* fields were selected for experiment late in the season when there were few to choose from. Altogether I report these experiments with misgiving and hesitation.

The *bájri* tests (Exp. Nos. 70 and 71) were taken each on mixed black soil. Neither field was manured; the first grew *bájri* alternately with cotton; the second *jowári*, *til*, cotton and *bájri* in undefined rotation. The season was fair; tillage good.

Outturn results were—

	Anna Estimate.	OUTTURN PER ACRE.		Value of outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		Principal Product.	By-product.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
First field (Exp. No. 70) ...	9	303	335	18 2 4	1 6 10	7.89
Second field (Exp. No. 71)...	10	270	365	16 10 10	1 12 9	10.78

This officer's *jowári* (Exp. No. 72) was tested on deep black soil assessed at about Rs. 3 per acre, and grows wheat, gram, cotton, and *jowári*.

The field was lightly dressed with some three carts of cowdung per acre. The variety of *jowári* grown is *Gári*. The season, &c., were as above. The outturn came to 558 lbs. grain and 260 bundles of *kadbi* per acre, together valued at Rs. 21-12-4. The incidence comes to 13·82 per cent. The field selected is stated to represent fair average of the locality. The total weight of *kadbi* came to about 4,700 lbs. per acre.

For his wheat experiments (Nos. 73 and 74) this officer selected two light black-soil fields in the same village. Both the fields are irrigated by private wells. Wheat of the *Botka* variety was grown in the one field and *Kusali* imported from the Berárs in the other. The fields were each manured with about four carts of cowdung manure per acre. Both grow *báji* and wheat and a variety of garden crops such as sweet potatoes, chillies, onions, *methi*, &c. Half of the second field is under guavas and lemons. The reported seed-rate, about 126 lbs. per acre, is high. The date of harvest and extent of irrigation have not been given.

The outturn results were—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.
		Principal Product.	By-product.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
First field (Exp. No. 73) ...	9	1,461	1,900	62 13 0	1 7 5	2·33
Second field (Exp. 74) ...	8	1,229	1,008	53 14 6	1 12 11	3·35

The crops are, I think, much underestimated at 9 and 8 annas. The ~~outturn~~ of grain in the first test is quite satisfactory. Grain has been rather highly valued at 28 lbs. in the one case and 24 lbs. in the other.

Mr. F. B. Young, Superintendent, Land Records and Agriculture, C. D.,

Forwards four tests from this district; three on wheat and one on gram. He has besides these submitted two other tests, one from Násik and another from Ahmadnagar district. All these have been worked out with great care and have been very fully reported.

All the three wheat fields (Exp. Nos. 75 to 77) had good mixed black soil of full depth. In the first there are no irrigation facilities, but in the other two there are. In the second field a well built in 1892 at a cost of about Rs. 700 waters about 4 acres (half the field). The third field is irrigated by means of a *pát* drawn from the river Kán across which a *pakka* dam has been built and kept in repair by the Public Works Department. The water-supply is ample. The first field is usually manured once in three years. It was last manured in 1895-96 with 70 cart-loads of a compost of stable refuse and ashes. The second field is manured every other year and was so manured with 40 carts of similar compost in March 1897. The third field is manured only once in four years and was so treated in 1895 before the rice was sown. The first field grew cotton in 1894-95, indigo and cotton in 1895-96, and indigo alone in the past year. The second field grows cotton, *jowári*, wheat and a number of garden crops such as sugarcane, chillies, tobacco, plantain and vegetables. On the third field the rotation is given as (1) rice, (2) sugarcane and then wheat for two years. In the first field deficient rainfall after sowing unfavourably affected the outturn to some extent. In the other two the crops being watered this deficiency was immaterial. The first field was ploughed this year and is usually ploughed every other year. Sesamum was sown seasonably in July, but was killed out by thick growth of weeds after heavy rain. The field was therefore prepared during August-September for wheat and was sown in October. The second field is ploughed every year. *Khondya* (a kind of *jowári*) was sown in June after the usual ploughing and reaped in October. The field after three harrowings was

sown with the wheat under test. The last field was ploughed seven times at intervals of a fortnight and harrowed twice before sowing. All the fields were quite clean and free from weeds.

The outturn results are shown below :—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.	Price of Grain per Rupee.
		Principal Product.	By-product.				
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.		Lbs.
First field (Exp. No. 75)	9	720	925	47 5 11	2 11 5	5.72	16 $\frac{11}{13}$
Second field (Exp. No. 76) ...	9	1,181	1,600	60 0 0	1 14 2	3.14	22 $\frac{2}{13}$
Third field (Exp. No. 77)	12 to 14	2,305	2,400	89 7 8	8 15 10	10.04	29 $\frac{1}{2}$

Grain has been priced very high in the first case and at an average rate in the third. In the first and second case the test crops were virtually second crops. Outturn in the third field represents a really good irrigated crop. The assessment, though it looks high on paper, is probably very moderate. It includes a charge for *patasthal* irrigation and the cost of irrigating a crop from a *pát* is trifling compared with the cost of irrigating by raising water from a well.

This officer's gram test (No. 78) shows also a satisfactory outturn. The field has black soil and is watered by a *pát* from *pakka bandhdaras* built across the Pánjra river by the Public Works Department. The water was insufficient. So only two waterings were given, once in November and second time in February. A third watering was desirable to bring the crop to perfection, but under ordinary circumstances the water probably would have been sufficient. The gram was a second crop after *bájri*. The *bájri* was grown because food-grain was scant and very dear. It yielded an average crop. The field, after the *bájri* was reaped, was prepared for gram and that crop was not sown until November or later than usual. If it had been sown earlier it would have got all the water that was necessary from the *pát*. The field usually grows wheat and gram in alternate years. It is ploughed annually; this year it was ploughed in May and June before the sowing of *bájri*. After reaping of *bájri* the field was ploughed three times before the sowing of gram in November. There were no weeds. The crop was reaped in middle of March and produced 928 lbs. grain and 800 lbs. of chaff per acre, together valued at Rs. 38-10. The incidence comes to 27.92 per cent. which is not high if count is taken of the fact that the cost of irrigation is practically included in the assessment, the cost of leading the water from the *pát* over the field being very trifling. The assessment inclusive of the water charge is Rs. 10-12-7 per acre.

The revenue history of the different holdings given by the experimenter is very interesting. The occupant of the first field purchased it 16 years ago for Rs. 60, quite a nominal price, as similar land is stated to be worth over Rs. 180 per acre or more. He owned in all 8 acres 7 gunthas assessed at Rs. 21-5. This land he has mortgaged to a Bhora for Rs. 140 and cultivates the same and other numbers as a yearly tenant. The debt was partly ancestral and partly incurred for marriage and other special expenses. The interest is now only 6 per cent., though it at one time had been as high as 30 per cent. In the latter case the sums were advanced on personal security without mortgage.

The occupant in the second test has come into possession of the field by inheritance and owns in all 31 acres, assessed at Rs. 69-8; he also owns and cultivates, in another village, lands assessed in all at Rs. 90. The lands are all unencumbered, but he has incurred a debt of Rs. 1,000, of which Rs. 500 were borrowed during the last famine to maintain his family and farm servants. The interest is 9 per cent. per annum. His household consists of himself, 5 brothers and their respective wives and 3 children. After paying all household expenses, he banks in an ordinary year about Rs. 500 on average.

The holding in the third case consists of 12 acres 12 gunthas assessed at Rs. 94-4. Of this 9 acres 25 gunthas assessed at Rs. 72-10 were sold 15 years ago to a Gujar for Rs. 1,500. The remainder has recently been mortgaged without possession to the same Sāvkar for Rs. 600 at $6\frac{3}{4}$ per cent. per annum. The number under experiment has been sublet, the cultivator having to pay all expenses of cultivation and the whole assessment, and receive two-thirds produce.

The holding in the fourth test comprises 6 acres 26 gunthas assessed at Rs. 73. The whole of it was sold seven years ago for Rs. 750 to a Gujar, who has sublet it to a Kulkarni at a yearly rent of Rs. 35 + Rs. 73 assessment. The Kulkarni has given it out for cultivation to two individuals, who provide two-thirds of the seed, pay two-thirds assessment and all expenses of cultivation, and receive two-thirds produce.

Na'sik.

Mr. Simcox followed the programme settled. Mr. Kábráji could not do any experiments owing to ill-health, and his successor, Mr. Artál, was fully occupied with plague duties and riots at Sinnar. Mr. Pherozsháh was asked to take tests on *ráji* and sesamum. But during their harvest he was detained at headquarters on plague work. Later when relieved he carried out an experiment on gram.

Mr. Young, Superintendent, Land Records and Agriculture, C. D., submitted one more test from this district.

Mr. A. H. A. Simcox, Assistant Collector,

Forwards three experiments; one each on cotton, groundnut and linseed.

The cotton field (Exp. No. 79) is situate within the cantonment limits of Málegaon. No assessment has been fixed by the Survey Department, but the occupancy right is sold by auction every third year. The charge for the test ~~field comes~~ to Rs. 1-7-3 per acre. The experimenter reports that lands in the neighbourhood of the field, but outside the cantonment limits, are assessed at from Rs. 1-4 to Rs. 1-8 per acre.

The soil is described as black with a fault of gravel. It grows (1) cotton (2) *bájrí*, and (3) *tíl* or *kulthi* in rotation. Only one crop is raised per annum. The season is reported poor. Early rains were scanty and the crop was stunted before the late rains came; and moreover like the same crop in other fields it was damaged by grubs and red beetles. The land was not manured for the test crop. Seed was sown at the rate of 20 lbs. per acre, a high seed-rate. Two pickings were taken, the first in the third week of November. The date of the second picking has not been given. The outturn came to 197 lbs. of raw cotton, worth Rs. 10-5-8 per acre. The incidence comes to 14.03 per cent., which is not high considering the season.

Mr. Simcox's second test (No. 80) was on groundnut raised on good black *pátasthal* land assessed at Rs. 6-7-5 per acre, soil and water combined. The outturn is very poor and its value must necessarily have been less than the cost of production. The land was ploughed three times and harrowed once and manured lightly with some six loads per acre ordinary manure. The reported seed-rate, 12 lbs. per acre, is, I think, an underestimate. The seed was dropped by hand in the furrow behind a plough in the usual way. The field was weeded and was quite clean. The ordinary rotation has not been stated. The cultivator intends growing rice and a pulse crop next year, the latter presumably as a second crop after the rice. The season is reported good. The outturn 1,050 lbs. of nuts in shell per acre, worth with the by-product Rs. 33, is very poor. The nuts were weighed and valued in the moist condition in which they were lifted. The sample of 80 *tolas* forwarded to this office lost by dryage 23 per cent. Thus the outturn per acre comes to 815 lbs. only of dry nuts. The haulms of the crop if reaped before they are quite dry provide useful fodder, and probably the by-product has been undervalued. The extent of irrigation is not reported.

This officer's third test (No. 81) was taken on a large field extending over 15 acres 24 gunthas. Of this 6 acres were sown with *jowári*, one with *tíl* and the remainder was under linseed. The experimenter tested rather a large plot

of 34 gunthas. The soil is black. It was manured for the test crop at the rate of about 2 carts per acre. The season was favourable and tillage good. No rotation has been given. If irregular, last three years' crops ought to have been given from the village records. The seed was sown in October and the crop reaped in the middle of February. The yield came to 402 lbs. of seed per acre worth with the by-product Rs. 17-8. The incidence comes to 9.88 per cent., which is moderate. The outturn is, I think, full average and is underestimated.

Mr. Phirozshah Pestonji, District Deputy Collector,

Forwards one test (No. 82) on gram taken on good black soil, which as a rule grows only one crop every year. It is usually a rabi one, wheat being the crop generally preferred. The owner had sown wheat during the past three years and could have sown it this year too, but for the fact that the seed was very dear this year and not easily procurable. The season was on the whole very fair. It would have been an excellent one but for the partial failure of later rains. As it was, the crop was not much below the average. The field belonged to a Kunbi who owns in all 48 acres of land assessed at Rs. 111. Part of this is garden and part dry-crop. The dry-crop land does not get the same attention as the irrigated fields. The experimenter observes that the dry-crop lands are so lightly assessed that even without much labour they yield enough to leave a fair margin of profit after the Government demand is paid. It might perhaps be added that irrigated crops are highly profitable only when the cultivator devotes skill, attention and liberal treatment to the cultivation. The expenses are so heavy that only a good crop pays well. No manure was applied to the test crop; all the home manure, cattle droppings, litter, &c., which the owner could collect being reserved for the irrigated lands. There had been very little weeding and not much watching either, as the crop was eaten in several places by cattle. The outturn came to 320 lbs. pulse per acre valued at Rs. 16-7-9. The incidence comes to 5.11 per cent.. The experimenter could not forward a sample *ser* of the grain, as he was hurried off to plague duty. He had, however, the grain dried for five days and the probability is that it was sufficiently dry in that period if the crop was fully ripe when harvested. The experimenter observes that the incidence of assessment on the value of yield per acre is very low indeed, but the owner's profits were probably not high, as seed was exceptionally dear this season. In ordinary years, however, there should be a good margin of profit, and landholders in Shivre, where the experiment was taken, have another advantage in the market town of Wani, which is quite close and where all kinds of produce find a ready sale at the weekly bázárs.

Mr. F. B. Young, Superintendent, Land Records and Agriculture, C. D.,

Submits a test (No. 83) on irrigated wheat from this district. The land is indifferent light black soil. It is irrigated by a *mot* from a well built by the occupant for which no charge is included in the assessment. The supply of water is ample and the land is usually double-cropped. In 1895-96 *bājri* and chillies were grown; in 1896-97 cotton and *bājri* were taken in the kharif season and *khondya jowāri* and maize in the rabi. In the present year *bājri*, chillies and brinjals were raised in the early season, and gram and wheat were grown as second crop. The test crop was thus a second crop. The field was twice ploughed and harrowed after *bājri* was reaped and then manured with about 40 to 45 cart-loads of stable refuse and dung and ashes. 91 lbs of seed was sown by drill per acre in November. The crop was watered once a week and weeded several times, so that it was quite clean at time of test. The crop became ripe at end of March and produced an excellent outturn of 2,347 lbs. grain and 3,000 lbs. chaff per acre, together worth Rs. 109-2-8 per acre. The grain is valued rather high at 23½ lbs. per rupee. The results indicate that with the aid of water and manure and liberal treatment a soil of inferior class can be made highly fertile, provided that the character of the soil is such that it can be irrigated to advantage.

The occupant holds in all 27 acres and 15 gunthas of land assessed at Rs. 89-5. Part of this is dry crop and part *bāgāyat*. He cultivates himself

19 acres 25 gunthas assessed at Rs. 9-1 of dry crop, and the rest he sublets to others, the rents being chiefly paid in produce, the value of which varies with market rates.

Ahmadnagar.

Experimenters were asked to take rests in *jowári*, *bájrí* and wheat. Mr. Padamji did one test on *bájrí* before he proceeded on leave owing to ill-health. His successor did not carry out the remainder of the programme which he should have done. Messrs. Brown and Ghosal did between them the three tests required from their sub-division. Mr. Pendse also did the work allotted to him.

Mr. Young, Superintendent, Land Records and Agriculture, C. D., conducted his sixth and last experiment in this district.

Mr. Sorábjí Padamji, Assistant Collector,

Submits a test (No. 84) on *bájrí*. The field had light soil and lies close to the village. It is never manured but enjoys the usual advantage of proximity to the village. It grew no crop last year. Previous to that it grew *jowári*. Seed was sown somewhat late in August and the crop suffered for want of late rain in October. Small quantities of *muth* and *mug* were sown mixed with the *bájrí* but they came to nothing. This is attributed to the bad quality of the seed which was purchased in the bázár. The outturn came to 226 lbs. grain and 1,500 lbs. of *sarmád* per acre together worth Rs. 14-1. The grain is priced rather dear at 22½ lbs. per rupee. The incidence is moderate.

Mr. J. Ghosal, Assistant Collector,

Forwards three tests; one on *bájrí* and two on *jowári*. These experiments are not satisfactory. The samples of local *sars* forwarded by this officer also overweighed the recorded weights. They are:—

	Weight recorded by the Experimenter.	Weight found in the Direc- tor's Office.	Difference.
	<i>Tolas.</i>	<i>Tolas.</i>	<i>Tolas.</i>
First experiment	110	113½	+3½
Second experiment	112	117½	+5½
Third experiment	110	117	+7

The *bájrí* experiment was carried out by Mr. Brown. He, however, left the district before submitting the report, and the results have been tabulated by his successor, Mr. Ghosal. The field selected had light friable soil with an admixture of stones. It grows *jowári* and *bájrí* in rotation with the usual pulse mixtures. The field extends to 13 acres 15 gunthas, and over the whole area the following quantities of seed were sown:—22½ lbs. *bájrí*, 11½ lbs. *tur*, 8½ *kulthi*, 1½ lbs. *rále*, ¾ *ambádi* and ½ lb. niger seed. Three rows were *bájrí* alone, the fourth had *tur* with a little *bájrí*. The other seeds were mixed and sprinkled all over. No manure was used. Sowing rain was insufficient but later ones were plentiful. *Bájrí* alone was tested and yielded only 60 lbs. of grain per acre. This may represent a small proportion of the gross outturn or it may not. Tests of this class are entirely unsatisfactory and the experiment is not included in the tabulated statement.

Jowári experiments taken by Mr. Ghosal were on black-soil fields both of which are irrigable by means of wells. Both fields grow *jowári* alone without any rotation and perhaps also without mixtures. Both fields were manured with about the same quantity of manure, 6¼ carts per acre of cowdung and rubbish. 22½ lbs. of seed was sown in the first case, 17 lbs. in the other. The crops suffered owing to blight brought on by excessive cold.

The outturn results were:—

	Anna Esti- mate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assess- ment.
		Principal Product.	By- product.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
First field (Exp. No. 85) ...	9	1,103	4,320	36 12 9	0 9 0	1.52
Second field (Exp. No. 86) ...	5	857	1,202	37 6 5	1 3 5	3.24

Both crops were irrigated but the extent of irrigation has not been reported. The more highly assessed field gave less outturn than the lowly assessed one. Grain is priced at $34\frac{1}{2}$ lbs. in the first case and $28\frac{1}{2}$ lbs. in the other. There was an interval of a month between the experiments. *Kadbi* is valued at 100 bundles per rupee in the first experiment and $1\frac{1}{2}$ rupee per hundred bundles in the other. The bundles in the first field averaged 9 lbs. each, so that the rate works out to 8 cwt. per rupee; while in the other case, each bundle weighs 90 *tolas* only, so that the per rupee rate comes to $1\frac{5}{8}$ cwt. The former is a cheap rate; the latter in ordinary seasons dear; but probably about right, considering that the district had barely recovered the effects of famine.

Mr. N. K. Pendse, District Deputy Collector;

Submits three tests; two on *bajri* and one on *jowari* mixed with *kardai*.

The *bajri* fields (Exp. Nos. 87 and 88) were selected in the same village and tested the same day. The first test was on a light-soil field which grew maize and *bajri* during the previous year and *bajri* alone two years previous to that. In the second case no crop was grown in the previous year, *bajri* in the preceding two. The soil is here sandy and black, locally called *Kerá*. Both fields have old wells in them which irrigate portions of the fields. The test crops were not irrigated. No manure was used in either field during the present year, but ordinary manure was applied in the previous year. Season was not quite favourable. Sowing rain was scant. A long break of about six weeks followed soon after sowing and affected the growth of the crops. September rain, however, improved prospects to some extent. Tillage was fair.

The outturn results were:—

	Anna Esti- mate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assess- ment.
		Principal Product.	By- product.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
First field (Exp. No. 87) ...	6	368	738	11 9 10	1 0 8	8.98
Second field (Exp. No. 88) ...	9	1,005	2,131	29 0 0	0 11 2	2.40

The experimenter does not offer any explanation regarding the superiority of crop in the second field. The outturn in that field represents a first class crop for such land in a favourable season and is certainly underestimated at 9 annas. The seed-rates reported are very low.

Mr. Pendse's third experiment (No. 89) was on *jowari* mixed with safflower. The soil is black *morvandi*. It gets no manure at any time. *Jowari* is always the principal crop. It is usually mixed with *kardai*. Patches of linseed and gram are also taken. In the current year gram was sown in a separate part of the field and linseed all round the borders. The season was not quite favourable. Rain was plentiful at sowing time but it failed entirely later on. Blight in the cold weather did further injury. This was the flowering time and the crop grew stunted and the grain was not well filled. The outturn is not unsatisfactory for

dry-crop rabi and is perhaps underestimated at 7 annas. The land was carefully worked and weeded. About 36 local *sers* of *jowári* and $4\frac{1}{2}$ of *kardai* were sown in the third week of September on $7\frac{1}{4}$ acres. The crop was cut on 5th March and gave 857 lbs. *jowári*, 35 lbs. *kardai* and 1,543 lbs. *kadbi* per acre, all worth Rs. 23-7-4. The incidence works out 4.10 per cent. The experimenter reports that the *kadbi* was not quite dry at time of test though it was exposed to the sun for a week.

Mr. F. B. Young, Superintendent, Land Records and Agriculture, C. D.,

Submits one more test (No. 90) on gram from this district. The field selected has good black soil of full depth, except in about $\frac{1}{3}$ the portion sown with gram. Throughout this extent the soil is faulty. This inferior soil is called by classers *Chopan* and the local name is *Khárvat*. These parts with inferior soil grew a poor crop, so that to get a fair average for the whole field three separate patches had to be reaped. The field has not been manured for several years. No crop was raised in 1896 (famine year), but wheat, *jowári*, gram, *kardai* and linseed were grown the year before. In the current year *bájrí* with the usual pulse mixtures was sown, but the crops failed and were ploughed in, and gram was sown at the end of September. Usually when moisture allows, gram is taken as a second crop after the *bájrí* mixture. The gram was sown mixed with *kardai* and a sprinkling of *jowári*. The subordinate crops being unripe were left standing in the field. Rain was favourable for sowing, but none later on. The acre outturn came to 531 lbs. pulse and 360 lbs. chaff, together worth Rs. 28-11-4. The incidence comes to 5.53. The grain is priced very high at 20 $\frac{5}{8}$ lbs. per rupee.

The occupant owns in all 32 acres 33 gunthas assessed at Rs. 48. The land is all rented on the half-share system. The occupant finds half seed and $\frac{5}{8}$ assessment and receives half the produce; the cultivator half the seed, $\frac{3}{8}$ assessment and all tillage expenses, and retains the other half of the produce.

Poona.

The programme settled for this district has been fairly followed. Mr. Sale could not, owing to exigencies of tour, carry out experiments on groundnuts and gram in Bhimthadi and Sirúr talukas as required. He therefore tested wheat and gram in Purandhar instead.

Mr. E. L. Sale, Assistant Collector,

Submits three tests, one each on *jowári*, wheat and gram. The reports are full and all details of interest are clearly given.

The specimens of measure *sers* forwarded to this office show an excess in each case— $2\frac{1}{2}$ *tolas* in the case of *jowári*, but 5 to 6 *tolas* in the case of other two crops.

The first experiment (No. 91) was taken on a poor stony *jiráyat* black-soil field assessed at Re. 0-7-9 only. Nothing was sown in 1896 (famine year); *jowári* was grown in the two previous years. Gram is also occasionally sown in patches. *Kardai* was sown in rows in the proportion of 8 rows of *jowári* to 2 of *kardai*. It was practically a failure. The experimenter did not test it, as it was not ripe at time of experiment, but has made an allowance of Rs. 1-14 as representing its value per acre. There was little rain after sowing and the crop suffered in consequence. The *kadbi* was affected by *chikta*, a sticky exudation from the stalks consisting mostly of sugar. The yield came to 263 lbs. grain and 405 bundles of *kadbi* valued together at Rs. 18-12 per acre. The incidence comes to 2.58 per cent. The experimenter observes that this does not represent the true percentage. Prices were higher than normal at date of experiment and the value of the produce in an ordinary year would have been little more than half what it was in the beginning of 1898, and consequently the percentage of incidence should be double of what is shown.

The wheat experiment (No. 92) was carried out on soil not much superior to that in the above test. The field was not manured, except with the droppings

of grazing cattle. *Jowari* preceded the test crop for the past three years. There was practically little rain after sowing. The crop was therefore very stunted in growth. Tillage was fair. Only 18 lbs. of seed is said to have been sown per acre. This must be an underestimate. The outturn came to 428 lbs. grain, worth with chaff Rs. 21-11-6 per acre. The incidence came to 2.68 per cent. The experimenter observes that the lowness of the incidence is due rather to high prices than any thing else, but the price of wheat was not so abnormally high such as that of other food-grains commonly eaten by the poorer people.

The gram crop (No. 93) tested by this officer was grown on good black *bagayat* land irrigable both by *pât* and by a well. The holding consists of some 16 survey numbers which are irrigated by a good old well at which 6 *mots* work throughout the day except in the hottest months when there is work only for 4. The fields are also irrigated by a *pât* from a stream, but this water is only available up to February. The test crop was watered only from the well. *Bājri*, groundnuts and gram had been grown during the past three years. The field was manured at the rate of 47 carts per acre of farm-yard manure. It was purchased locally at Re. 1-4 per cart-load. About 150 lbs. of seed is said to have been sown per acre. The seed-rate is quite three times higher than necessary. The resulting crop came to 1,010 lbs. pulse per acre worth Rs. 34-1. The incidence comes to 29.35 per cent. The land with its valuable irrigation facilities is capable of growing valuable garden crops, with which gram would prove a good rotation crop.

Mr. K. B. Deval, District Deputy Collector,

Submits three tests; one each on wheat, potatoes and onions.

Unirrigated and unmanured wheat (Exp. No. 94) formed the subject of this officer's first experiment. It was raised on a rather poor black soil field assessed at only Re. 0-9-5 per acre. The same crop has been grown for the past five years. Sowing rain was seasonable, but later rains failed and the crop suffered in consequence. About 55 lbs. of seed sown in October produced at end of January 201 lbs. of grain and 406 lbs. by-product together valued at Rs. 13-10-4 per acre. The grain has been priced very high at 15 lbs. per rupee nearly double the market rate later in the season.

This officer's second test (No. 95) was on potatoes grown on medium black soil which has been assessed at dry-crop rates, but in which a well has recently been built and which now grows a number of garden crops. In 1893 and 1894 the field grew *bājri* alone. In 1895-96 *shālu jowari* was raised. In 1896-97 *bājri*, chillies, potatoes, groundnut, *shālu jowari*, *ratālas* and carrots were grown. In the year of report *bājri*, *jowari*, chillies, *tur*, *math*, potatoes, onions and *ra'talu* occupied different parts of the field. The potato under test was a second crop after *bājri*. The field was manured with about 20 cart-loads of cowdung and sweepings after the reaping of *bājri*. The water-supply was ample, the field carefully worked; but the outturn is stated to have suffered somewhat on account of late sowing. The sets which were planted in November weighed about 818 lbs. and produced in about 4½ months 3,690 lbs. of tubers valued at Rs. 39-8-6. Owing to prevalence of plague the market price was very low, 93 lbs. per rupee. In ordinary times the crop would have fetched at least double its present value, but the outturn was poor and is overestimated at 9 annas.

Mr. Deval tested onions (No. 96) on a black-soil field assessed at Rs. 2-14-8. It is irrigable by means of a private well built before the revision survey. *Bājri* was grown during the past four years with *shālu jowari* (*Khondya*) as a second crop last year. The field is capable of growing two crops every year, but the cultivator is unable to do so owing to dearness of manure, which is stated to be selling at the high rate of Rs. 5 per cart-load. The cart-load referred to, is a four-bullock load of considerable size. The carts have quite three times the capacity of ordinary country carts. 5 cart-loads were put upon 24 gunthas, the area under onions. The seed-rate was high; about 16 lbs. of seed per acre was sown in June in the seed-bed, the extent of which has not been given, and the young plants planted in September. The crop became ripe in March and produced 11,840 lbs. of bulbs valued at Rs. 55-7-6 per acre. The onions have been priced very cheap at 107 lbs. per rupee. But they must have lost at least 10 to 15 per cent. by weight

in dryage within a few days after they were harvested. A good crop of onions on such land under liberal cultivation would exceed 20,000 lbs. per acre.

Shola'pur.

Mr. Kennedy, Assistant Collector, did not experiment owing partly to "the unfavourable nature of the season which made the finding of a suitable crop a matter of difficulty" and partly to his being engaged for the most part on plague duty. Mr. Bengiri carried out the programme.

Mr. R. P. Bengiri, District Deputy Collector,

Submits three tests; one each on *bájrí*, gram and *jowári*.

The *bájrí* (Exp. No. 97) was grown on black *murmát* soil which grew *jowári* during the past three years. Last year (famine year) it was a total failure. About 25 carts of household refuse was applied per acre. Sowing rain was seasonable, but a prolonged break in the middle of the season adversely affected the crop. Later rains improved prospects. Seed-rate, $3\frac{3}{4}$ lbs. per acre, is under average. The yield came to 656 lbs. grain and 1,320 lbs. useful by-product, together worth Rs. 32 per acre. Grain has been valued high, at $22\frac{3}{5}$ lbs. per rupee. The incidence is low.

Mr. Bengiri's other two tests (Nos. 98 and 99) were taken at Sheogaon in the Pandharpur taluka. The samples of local *sers* forwarded to this office weighed 2 to 3 *tolas* in excess of the reported weights. The soil of each field is black and similar in quality. No manure was used on either field. The gram field grew (1) *jowári*, (2) *jowári* and gram, and (3) *jowári* alone during the past three years; the other field, *jowári* continuously. Sowing rain was favourable but later rains deficient. Tillage is reported as good in both fields. The out-turn results as shown below are by no means unsatisfactory.

	Anna Esti- mate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percent- age In- cidence of Asses- ment.	Remarks.
		Princi- pal Pro- duct.	By- product				
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.		
First field (Exp. No. 98) ...	12	895	...	28 8 3	1 3 9	4.33	Gram.
Second field (Exp. No. 99) .	12	899	1,551	27 5 4	1 1 4	3.96	<i>Jowári</i> .

A well has recently been constructed in the gram field but the test crop did not get any benefit therefrom. Apparently such assistance was not needed and the outturn in both fields indicates that the season was by no means unfavourable for either rabi *jowári* or gram. The crops may safely be estimated as full average for a district so liable to periodic failure.

Sa'ta'ra.

Both the First Assistant and the District Deputy Collectors were prevented from doing crop experiments owing to work in connection with the plague. The Second Assistant Collector carried out the programme as settled.

Mr. E. Clements, Assistant Collector,

Forwards three experiments; two on *bájrí* and one on rice.

The test fields in the case of *bájrí* (Nos. 100 and 101) were not selected as representing average crops of the locality, but as being most accessible to the experimenter, who was on plague duty. He states that very little *bájrí* is grown in the part in which he had camped. The crop in the case of the second field had besides a considerable number of ears eaten up by birds and thus much grain was lost. The first field has red soil, was not manured for the last five

years and grows (1) *bājri*, (2) *Dukri jowāri* and (3) a rabi crop such as gram in rotation. The second field has reddish black soil, was manured with 10 to 12 carts per acre of the village sweepings, and grows (1) *shālu jowāri*, (2) *bājri* and (3) gram or *Khapli* wheat in rotation. Season was good in either case and tillage indifferent, but in what respects is not stated. Only 4 lbs. of seed per acre was sown in the first field, 19½ lbs. in the other. One estimate seems to be as low as the other is high.

The outturn results were :—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn	Assessment per Acre.	Percentage Incidence of Assessment.
		Principal Product.	By-product.			
		Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
First field (Exp. No. 100) ...	10	151	345	7 4 5	1 8 2	20·74
Second field (Exp. No. 101) .	10	171	405	8 3 9	3 11 0	44·78

The incidence is high in both cases and particularly so in the second case. The crops are decidedly poor and are much overestimated at 10 annas each.

Mr. Clements tested rice (No. 102) on a good red soil field which grows the same crop year after year. About 30 carts of dry manure were applied per acre. The season was favourable and the crop carefully cultivated. About 7 to 8 gunthas of seed-bed had sufficed for an acre of field. The crop was reaped in October and gave 2,515 lbs. of rice in husk and 3,200 lbs. of straw per acre, together worth Rs. 62-11-4. The incidence comes to 5·86 per cent. Grain has been valued at 47½ lbs. per rupee, which is an ordinary rate. Rice straw has been valued at Rs. 9-6 per acre, which is rather high considering the season. Seed-rate reported, 19 lbs. per acre, is not sufficient.

SOUTHERN DIVISION.

Belgaum.

None of the officers in this district were able to carry out any experiments owing to their being engaged in combating the plague.

Bija'pur.

An elaborate programme had been arranged for in this district. But Mr. Kelkar is the only officer who attended to this part of the work. The absence of experiments by other officers is explained to be due chiefly to their transfers or departures on leave.

Mr. J. L. Lushington, Superintendent, Land Records and Agriculture, S. D., could not experiment owing to his being placed on plague duty.

Mr. V. R. Kelkar, District Deputy Collector,

Submits three experiments; one each on gram, linseed and rabi *jowari*. The experiments have, as usual, been carefully worked out and intelligently reported.

No crop was raised on any of the fields during the previous year (famine year) owing to failure of rains. The tillage preparation was as careful as usual and under ordinary circumstances the crops tested would after fallow have yielded well, but the rainfall, though sufficient at the time of sowing, was wholly deficient later, and consequently the yields range only from 5 to 6 annas. None of the fields were manured. The tillage in each case is described as good. The gram was grown on dark red *kyásari* soil, linseed on *masári* (slightly red) and *jowári* on deep black soil.

The outturn results are given below :—

	Anna Esti- mate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percent- age Incidence of Assess- ment.	Remarks.
		Princi- pal Pro- duct.	By- product.				
		Lbs.	Lbs.				
First field (Exp. No. 103)...	5	192	245	6 8 6	0 10 9	10·36	Gram.
Second field (Exp. No. 104).	6	161	265	7 4 2	0 9 4	8·07	Linseed.
Third field (Exp. No. 105) .	6	621	1,620	22 10 6	0 12 3	3·38	Jowári.

The crops in each field were irregular in growth. The experimenter had to take tests in patches. This enabled him to avoid rows of *kardai* which had sparingly been sown in the first and second fields. The outturn of *jowári* appears fairly satisfactory, that of the gram crop somewhat poor. The *jowári* field forms part of an Inám land which has been leased out for Rs. 200 for seven years (full payment in advance). The tenant has besides to pay the annual quit-rent of Rs. 21, total assessment of the whole land being Rs. 35.

Dha'rwa'r.

No experiments were undertaken by the First and Second Assistant Collectors owing to their being engaged on plague duty, the former at Hubli and the latter at Dhárwár. Later on, the District Deputy Collector was similarly engaged at Gadag and could not carry out the fourth experiment required of him.

Mr. R. R. Bhardi, District Deputy Collector,

Forwards a test (No. 106) on Kumpta (indigenous) cotton which is unsatisfactory, in as much as it was commenced by one officer (Mr. Sáthaye) and completed by another (Mr. Bhardi). The crop was selected as average by Mr. Sáthaye, who selected the test area and supervised the first picking. He was

then transferred to Kánara and Mr. Bhardi completed the experiment by testing the second picking. Mr. Sáthaye gives the price of *unginned* cotton at 18 lbs. 16 *tolas* per rupee. Mr. Bhardi gives the price of *ginned* cotton 15 days later at 22 lbs. 30 *tolas* per rupee. This rate must refer to *unginned* cotton; but even if it does, it is remarkable that the price should vary within a fortnight to the extent reported. The crop was grown in ordinary black soil assessed at Re. 0-12-9 per acre. The fields grow, in undefined rotation, wheat, cotton and *jowári*, the cereals having safflower as a subordinate crop. The season is described as favourable and the tillage good, but no manure has been applied for several years. The crop yielded 315 lbs. seed cotton per acre. The gross outturn (at the rates quoted) was worth Rs. 16. Incidence works out 4.98 per cent. The seed cotton yielded only 28 per cent. of lint according to Mr. Bhardi's figures. This percentage is considerably under average.

Mr. V. N. Sáthaye, District Deputy Collector.

Forwards two tests; one on wheat and another on gram. In each field a mixed crop was grown. In the wheat field, safflower occupied every 7th row. In the gram field, *jowári* and gram were sown mixed in equal proportions. The experimenter tested wheat and gram only, and makes a proportionate deduction in test areas before finding out the acre average. But as this system of treating mixed crops has been found defective, the acre averages have been calculated as if the test areas were occupied by the test crop alone. The samples received in this office were found to differ from the weights recorded by 5 *tolas* in the case of gram and 7 in the case of wheat.

The wheat (Exp. No. 107) was grown on a black-soil field which grew late *jowári* and gram and cotton during the previous two seasons. The land has received no manure since 1894-95. The season is reported favourable and tillage good. The outturn, exclusive of the safflower which occupied every 7th row, came to 324 lbs. grain and 296 lbs. chaff per acre, together worth Rs. 14-10-8. The incidence comes to 8.59 per cent. This is not low considering that the price of wheat was higher than usual owing to the previous year's famine. Prices, however, fell later in the season.

The gram (Exp. No. 108) was grown also on black soil. This test is unsatisfactory, because no information is given regarding the character of the *jowári* mixed with it. That crop might have been good, bad or indifferent. The gram only yielded 73 lbs. of pulse per acre worth Rs. 2-12-5. The incidence works out 43.52 per cent. But no useful inference can be drawn from the figures. The mixed crop of gram and *jowári* was a second crop, *navani* or Italian millet having been grown in the kharif season. No manure has been applied for the last four years. Wheat with safflower, cotton, *jowári* and gram have been grown during the past three years. The season and tillage are described as favourable and good respectively.

Kola'ba.

Mr. Brooke, Assistant Collector, made two experiments in salt rice, but the results were so unsatisfactory that he did not think them worth showing up. Later he had no opportunity, owing to plague work in his charge, of experimenting on rice or rabi crops. Mr. Thakár has submitted an experiment on *nágli*. He could not do a second test on the same crop, as harvesting was all over before he completed his first experiment. He had to leave unfinished an experiment on gram, as he received telegraphic orders to proceed to Revdanda to look after the plague arrangements there.

Mr. G. P. Thakár, District Deputy Collector,

Forwards a test (No. 109) on *nágli*. He reports that much *nágli* was not grown in his district but that it was grown over a considerable area in the village selected. Early or *Halvi nágli* had been mostly grown, because the cultivators after a year of famine were desirous of getting food-grain for consumption or sale as early as possible. *Halvi nágli* does not yield so well as *Garvi* or late *nágli*, the variety usually grown. The experimenter reports that the *nágli* crops were mostly being reaped when he selected his field for experiment. The crop did

not yield particularly well, but at the same time the particulars reported indicate that the field was over average for the village. The owner is in easy circumstances and has sufficient cattle for the cultivation of his holding. The field is not far from the village. It is on an elevated situation but is tolerably level and therefore retains moisture. The soil is red of good quality and free from stones. One-third of the survey number can be cultivated in any one year, but usually a larger proportion is left under grass, which is reported to grow luxuriously and to be worth Rs. 3-8 per acre on the spot. I take this to mean that the occupant can get Rs. 3-8 per acre for the grass without undergoing any expense. A crop of *vari* is taken after the *nágli* and the land lies waste for two or three years.

The cultivation is described as very careful, the field being well ploughed and weeded. The seed-bed was liberally *rábed* with cowdung and grass but the field got no manure. The proportionate area of seed-bed to area of transplantation was as 1 to 5 and the seed-rate works out $6\frac{1}{2}$ lbs. per acre transplanted. The seed was broadcasted in June and seedlings transplanted in July. The resulting crop yielded 704 lbs. grain and 1,020 lbs. of by-product per acre, together worth Rs. 20-9-7. The incidence is only 2.19 per cent. The season was favourable.

Ratna'giri.

Mr. Chuckerbutty did only one test, as at the beginning of the touring season he was laid up with a sprained instep, and when he got over it all the crops had been reaped. Mr. Swifte was unable to do the full number of experiments owing to plague duties, which obliged him to leave his camp just as crops were being got in. The District Deputy Collector was asked to take tests on sesamum. The crops were harvested before receipt of orders. He therefore selected other crops instead.

Mr. A. W. G. Chuckerbutty, Assistant Collector,

Submits a test (No. 110) on *harik*. The crop was raised on a *bharad varkas* and of the ordinary kind, i. e., gravelly and sloping. Three crops of *nágli*, *harik* and *tíl* are grown, after which the field is allowed rest for eight or nine years. The season was good. Tillage is described as indifferent but in what respects is not stated. No manure was used. Usually manure is applied only to the first crop of the rotation.

The crop yielded 702 lbs. of grain and 1,225 lbs. straw per acre, together worth Rs. 19-15-2. The incidence comes to 0.94 per cent., which even allowing for fallows is extremely moderate. The grain, however, has been valued at $36\frac{3}{4}$ lbs. per rupee, a rate which is much higher than that prevailing in ordinary years, and due to scarcity in the famine year.

Mr. L. C. Swifte, Assistant Collector,

Forwards two tests; one on *harik* and another on *nágli*. The test areas have not been selected in accordance with standing orders. In the case of *harik*, the test area was made up of two pot numbers, which, though they adjoined each other and belonged to the same person, bore different rates of assessment. The extent of *pot kharáb* area (which bears no assessment) occurring in the two numbers has not been shown, but there is no doubt of its existence, as $1\frac{1}{4}$ guntha has been deducted from the test area as being *pot kharáb*. Thus the actual assessment of the test area cannot be accurately ascertained and the incidence deduced thereon is not quite correct. Similarly in the case of *nágli* the test area has been made up of two different survey numbers with different rates of assessment. They adjoined and belonged to the same person. In this case the *pot kharáb* areas have been shown and the exact areas tested in the two numbers have also been shown. So the incidence will be quite correct. In this case the experimenter explains that harvesting operations were general and had been commenced in the fields he chose for experiment. Fields which have been partly reaped should not be tested, especially in the case of *varkas* lands which generally grow uneven crops. The experiments, therefore, are reported with some misgiving.

The *harik* crop (Exp. No. 111) was raised on fairly level land with thin oil, which, however, is reported superior to average *harik* lands. The field

grows (1) *nágli*, (2) *harik*, (3) *vari* and (4) *khurásni* (nigerseed) erroneously called *til*, after five years' fallow. The *harik* was unmanured. Manure is applied only to the first crop and also sometimes to the third (*i. e.*, *vari*,) in the rotation. The season was favourable and the test crop was regarded as the best obtained in the past twenty years. This conclusion may be doubted. The outturn was 466 lbs. grain and 32 bundles straw per acre, together worth Rs. 10. The incidence works out to 2·39 per cent. *Harik* is the poorest and least valuable crop in the rotation; on the other hand the returns from the land during the years of fallow cannot be much. Count should be taken of these considerations in gauging the incidence of assessment.

The officer's second experiment (No. 112) was taken on *nágli* which formed the third crop in the rotation. The land is *bharad varkas* and grows (1) *nágli*, (2) *harik*, (3) *nágli*, (4) *harik* or *sarvat* rice and (5) *til* (nigerseed); after which four years' rest is allowed. The usual *ráb*, consisting of 50 head-loads of cowdung, 60 of *kaval*, 80 of grass and 12 of *harik* straw, was burnt on the land. No fish manure was used, and therefore the cultivation though in other respects careful is described as indifferent. The season was quite favourable. The yield amounting to 766 lbs. grain and 24 bundles of straw per acre, together worth Rs. 25, is fairly satisfactory. The market rate for produce is higher than in average years; otherwise the incidence, which works out to 1·35 per cent., would be higher.

Mr. V. D. Yennemadi, District Deputy Collector,

Submits four carefully reported tests; one on *harik*, one on nigerseed and two on *nágli*. All the villages in which the tests have been taken are under the *Khote* tenure and the occupants have to pay one-third share of the produce to the Khots, except in the case of the third test, in which one-fourth is levied. The cultivator, a *Bráhma*n, has obtained possession of the field by mortgage.

The *harik* test (No. 113) was taken on fairly good level *varkas* land, which after seven years' fallow is capable of growing the following sequence of crops:—(1) *nágli*, (2) *harik*, (3) *vari*, (4) nigerseed and (5) *sarvat* rice. The *harik* was, as usual, unmanured. The reported seed-rate, *viz.*, 31 lbs. per acre appears high.

The nigerseed crop of the second experiment (No. 114) was grown on similar soil; and the same crops as in the first experiment are taken in the same order after six years' fallow. The tested crop was the fourth in the rotation and no manure had been applied for any of the crops taken since the land was waste. Perhaps, therefore, although the outturn was poor, the crop was as good as the cultivator had reason to expect. The tillage expenses after sowing were nominal. The reported seed-rate, 11½ lbs. per acre, is much over average.

The *nágli* tests (Nos. 115 and 116) were taken on somewhat superior soil. The first field grows five crops after five years of rest; the second, four crops after three years of rest. In both *nágli* was the first crop in the rotation. Seedlings were at first raised in seed-beds and then planted over the fields. The seed-beds were *rábéd* as usual. The experimenter reports that in April, 10 head-loads of cowdung, 35 of tree loppings, 45 of grass and 15 of dry leaves were spread in different layers on 10 gunthas. Sifted earth, mixed with husk of rice, was spread on the last layer and then the *ráb* material was set on fire. With the first monsoon showers the seed was broadcasted and the seed-bed ploughed. The field was ploughed and cross-ploughed at intervals of 7 or 8 days, 5 times before the seedlings were transplanted. They were transplanted when about 9 inches high and those in the seed-bed were thinned out for the purpose, a sufficient number being left in the seed-bed to fully occupy that area. The method of transplanting as reported by the experimenter is not quite understood. He says, "in transplanting the seedlings no holes were made. Seedlings were simply placed on the ground at a distance of four fingers from each other. In course of 4 or 8 days, the seedlings took root and stood erect." The usual method, where holes are not made, is to push the roots of the seedlings into the soft mud at distances 3 or 4 inches apart from each other. The crop was weeded twice. No fish manure was used. It is seldom used in villages remote from the coast.

The outturn results are shown below :—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assessment.	Remarks.
		Principal Product.	By-product.				
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.		
First field (Exp. No. 113) ...	12	741	...	14 0 2	0 2 5	1·07	<i>Harik.</i>
Second field (Exp. No. 114)...	12	94	..	4 9 4	0 2 4	3·18	Nigerseed.
Third field (Exp. No. 115) ...	12	903	1,041	36 15 3	0 5 0	0·84	<i>Nagli.</i>
Fourth field (Exp. No. 116)...	10	609	628	24 9 9	0 4 4	1·10	<i>Nagli.</i>

The market rates were higher than usual, but even considering the circumstances, the incidence is low in three of the tests and not particularly high in the second test, which was taken on a crop which, it seems, is considerably overestimated at 12 annas.

Kanara.

Experiments on rice, *rāgi* and sugarcane were selected for tests. Messrs. Deshmukh and Sāthaye did between them two experiments on rice and one on sugarcane. Mr. Keatinge did three tests on rice.

Mr. L. G. Deshmukh, Assistant Collector,

Forwards two experiments ; one on rice and another on sugarcane.

The rice (Exp. No. 117) was grown on a *revachi* or sandy soil field, which enjoys no irrigation facilities and grows kharif rice only every year. About 2,000 head-loads of cattle manure, house sweepings and dry forest leaves were spread on the whole field (area $6\frac{3}{4}$ acres) and the field was several times ploughed and levelled. The cultivation was good and season favourable. About 103 lbs. of seed sown in June produced at middle of October 2,368 lbs. grain and 3,760 lbs. straw per acre, together worth Rs. 96-2. This outturn for broadcasted rice may be considered very satisfactory. The incidence works out 5·55 per cent. The grain may have been overvalued at 26 lbs. per rupee. At the commencement of the season, prices were everywhere high. They, however, fell rapidly as the new produce appeared in the market. Probably the gross value of produce, as estimated above, is higher than actual returns for produce sold.

This officer's sugarcane test (No. 118) was taken on yellowish clayey soil mixed with small stones, which lay fallow during 1894-95 and 1895-96 and grew sugarcane during the years 1896-97 and 1897-98. The field is irrigated by lift from a channel drawn from a stream dammed at about a furlong from the field. The crop is reported to have been watered 12 times a month during February, March, April and May ; but this can hardly be credited. Cattle manure was used as manure. About 10,000 seed tops are said to have been planted on an acre of field. The land was burnt with grass, leaves and branches of trees and ploughed, and the tops were planted in February after irrigating the land in rows 3 feet apart, with interval of a foot between sets. A month after planting, burnt earth was put at the foot of each clump of shoots. Manure was added in June and covered with earth. The crop was ripe in 11 months and gave 2,550 lbs. *gul* and seed tops and green leaves together weighing 7,370 lbs. The whole is valued at Rs. 218-13-10. The by-product seems to have been overvalued at Rs. 59. The outturn of *gul* was poor, but the market rate was fairly high. Mr. Deshmukh does not give details as to weights of cane, juice, &c., so as to compare results with those obtaining elsewhere. The land bears a low assessment at *jirāyat* or *khushki* rates, i. e., Re. 0-6-5 per acre. The occupant is stated to have converted the land into *bāgāyat* at considerable expense.

Mr. G. F. Keatinge, Assistant Collector,

Submits three well reported tests on rice ; two on the early or monsoon variety and one on the hot weather or *Vaingan* rice.

Mr. Keatinge's first test (No. 119) was taken in the village of Bád, where experiments were also taken in the previous two years. The soil is sandy brown. It is of the same kind throughout the village. The first layer is of dark-brown earth nearly one inch thick and below that it is sandy. The test field grows rice every year without a second crop. Before sowing it was manured with about 50 head-loads of compost of cowdung and dry leaves. The reported seed-rate, 188 lbs. per acre, even for broadcasted crop is rather high. The crop was reaped early in October. The outturn came to 2,939 lbs. grain and 3,666 lbs. by-product, together valued at Rs. 119-14-5. The grain has been valued very high, at $26\frac{1}{6}$ lbs. per rupee. Prices soon fell, and later in the season the crop was worth not much more than half the experimenter's valuation. Prices taken during three years in this village are compared below :—

Year.	Anna Esti- mate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage Incidence of Assess- ment.	Price of Grain in lbs. per Rupee.
		Principal Product.	By-product.				
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.		Lbs.
1895-96 ... {	14	3,210	5,430	63 0 7	2 14 0	4.56	57
	12	3,013	4,462	54 4 0	4 1 10	7.58	60 $\frac{1}{2}$
1896-97 ...	9	2,096	2,927	45 4 0	4 8 2	9.96	53 $\frac{3}{4}$
1897-98 ...	12	2,939	3,666	119 14 5	4 10 3	3.87	26 $\frac{1}{6}$

Mr. Keatinge's second test (No. 120) was taken on land which naturally had a slight slope, but which had been artificially terraced and embanked for rice. The field is irrigable from a tank, but water is used only when rain fails. Apparently water is insufficient, as the cultivator is unable to grow a second crop and has ceased growing sugarcane which he used to raise two years ago on part of the field. The manure consisted of the usual compost of cowdung, dry leaves and town refuse. The rainfall was somewhat short in September and the crop had to be watered once. The crop was raised from drilled seed. It produced 2,591 lbs. of rice and 5,437 lbs. of straw per acre, together valued at Rs. 89-12-8. The market price for grain was, as remarked above, considerably higher than usual. The incidence comes to 4.24 per cent.

This officer's third experiment (No. 121) was on hot weather rice. It was grown on a field situated in the midst of spice gardens and heavy *jungles* on the Yellápur *gháts*. The experimenter reports : " The great difficulty with which the cultivators of these parts have to contend, is the scarcity of cool labour and the unhealthy climate. If labour were more plentiful, much more might be done on lands like this."

The field is irrigated by means of a stream which flows from a spring $\frac{3}{4}$ mile from the field under test. The water-supply is not sufficient to irrigate the whole number, as it irrigates several other fields. Only two acres, therefore, out of the number are cultivated a second time. The spring from which the water flows being in a private field, and the repairs to the dam, &c., being made by cultivators themselves, no water-rate is levied on the land by Government; nor does the owner of the spring receive anything.

About 200 baskets full per acre of the compost of cowdung, rubbish and leaves was spread on the field before sowing, *i.e.*, early in January. Seed was sown broadcast in the middle of January and the crop was reaped on 20th May. At the end of the season the water from the stream became scanty, but the crop benefited by a fall of rain about this time. The cultivation is said to be only fair on account of scarcity of labour. The outturn came to 1,752 lbs. grain and 1,992 lbs. straw per acre, together worth Rs. 38-15-11. The incidence comes to 8.70 per cent. This is on the second crop alone. The first or monsoon crop is said to be equal to or superior to the second. Sugarcane is grown in about half an acre in another part of the field.

Mr. V. N. Sathaye, District Deputy Collector,

Forwards one test (No. 122) on late rice. The field is only 7 gunthas in area and it is not clear whether it grows only a hot weather crop. Presumably it grows a kharif crop also. The test crop was raised on soft brown soil mixed with little sand. This kind of land is said to be eminently suitable for the kind of rice grown. The field was ploughed 6 or 7 times at an interval of 2 or 3 days, the first ploughing being given a month before sowing. The usual compost of cowdung, leaves and straw was spread at the rate of 115 head-loads per acre. The crop is watered from a channel running by the side of the field and leading from a dam about a mile away from the field. The supply is generally sufficient and was this year quite plentiful. Tillage was good. About 166 lbs. of seed sown broadcast at end of November produced in five months 1,606 lbs. grain and 2,510 lbs. straw per acre, together worth Rs. 43-10-8. The incidence works out to 13·03 per cent.

J. W. MOLLISON,

Deputy Director of Agriculture.

Dated Kirkee, 4th October 1898.

TABULAR SUMMARIES.

Summary of Crop Experiment Reports,

O. S.—Original Survey;

No.	District, Taluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formula.	AVERAGE PER ACRE.					
					Seed.	Yield of		Total Value of Outturn.	Assessment excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.
						Principal Product.	By-Product.			
1	2	3	4	5	6	7	8	9	10	11
	AHMADABAD.		Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.
	<i>Mr. H. D. Rendall, Assistant Collector.</i>									
1	Sánand (Deoti) ...	Rice (Sutarsál), 9th November 1897.	8	1,300	7	942 in husk	1,477	29 13 4	4 8 7 R. S.	15.19
2	Do. (Pipláv) ...	Great millet (Jowár), 9th November 1897.	5	480	19	195	5,800	15 9 0	2 6 11 R. S.	15.62
	<i>Mr. C. V. Vernon, Assistant Collector.</i>									
3	Daskrohi (A'sarva) ...	Do. do. November 1897.	9	740	76	232	5,594	35 13 11	6 3 7 R. S.	17.35
4	Do. (Bágpardosh) ...	Spiked millet (Bájri), November 1897.	12	975	12	526	2,029	34 14 9	4 7 1 R. S.	12.72
5	Parántij (Modása) ...	Wheat (Vájia), 24th February 1898.	8	950	164	1,462	...	53 7 0	1 15 4 R. S.	3.66
	<i>Mr. Pránlál Harkisandás, District Deputy Collector.</i>									
6	Dholka (Dholka) ...	Gram, 6th March 1898.	8	400	35	930	770	38 10 9	2 5 0 R. S.	5.97
	<i>Mr. D. N. Nánávati, District Deputy Collector.</i>									
7	Dhandhuka (Sodhi) ...	Wheat (Chásia), 1st March 1898.	9	675	51	357	190	12 11 0	1 14 2 R. S.	14.86
8	Do. (Kareda) ...	Do. (Potalia), 16th March 1898.	7	830	115	1,335	1,627	57 0 0	1 2 2 R. S.	1.99
9	Do. (Bhadiád) ...	Gram, 3rd March 1898.	10	500	25	295	156	10 1 4	1 5 10 R. S.	13.53
	KAIRA.									
	<i>Mr. F. X. D'Souza, Assistant Collector.</i>									
10	Mehmadabad (Kaira) ...	Spiked millet (Bájri), 2nd October 1897.	9	675	18	903	2,602 straw, 750 chaff.	47 9 0	5 1 10 R. S.	10.76
11	Do. (Chhápra) ..	Do. do. 4th October 1897.	7	525	14 $\frac{1}{4}$	303	718 straw, 375 chaff.	16 15 1	4 2 0 R. S.	24.14

Northern Division, 1897-98.

R. S.=Revision Survey.

Area of Tst.	Equivalent in Tolas of local measure Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
		Princi- pal Product.	By- Product.	
12	13	14	15	16
A. g.	Tolas.	Lbs.	Cwts.	
0 4	40 (weight)	32 $\frac{1}{2}$	11 $\frac{1}{2}$	<i>Experiment No. 1</i> —Rice, <i>Sutarsdl</i> , on good black soil growing the same crop every year. Field manured with 18 carts of cowdung per acre. Crop irrigated from a tank by lift. The extent of irrigation not reported. Season unfavourable. Rain scanty at commencement, later on very heavy. Seed-rate low. Tillage good.
0 8	Do.	36 $\frac{1}{2}$	7 $\frac{1}{2}$	<i>Experiment No. 2</i> — <i>Jowár</i> on dry crop <i>gorádu</i> land growing <i>jowár</i> and <i>math</i> in alternate years. Field not manured this year, but last year received 14 carts of the ordinary cattle manure. Season and tillage as above. Crop only 2 annas of the formulæ. <i>Kadbi</i> not dry when weighed.
0 8	Do.	32 $\frac{1}{2}$	17 $\frac{1}{2}$	<i>Experiment No. 3</i> — <i>Jowár</i> on highly assessed <i>gorádu</i> land growing annually the same crop with patches under castors and tobacco. About 35 carts of cowdung and town sweepings applied per acre. Season unfavourable. Crop lodged by heavy late rains. Tillage good. Outturn of grain very low; that of <i>kadbi</i> high. The latter priced very high.
0 8	Do.	23 $\frac{1}{2}$	1 $\frac{3}{4}$	<i>Experiment No. 4</i> — <i>Bájri</i> on similar land, assessed at a lower rate, growing the same crop almost every year with occasionally a second crop. Sugarcane also grown sometimes. Field manured with 18 carts of cowdung and 9 of nightsoil per acre. Seed had to be sown three times, the first being eaten by insects and the second washed by heavy rain. Later on, season more favourable. A sprinkling of <i>mag</i> , <i>math</i> and <i>tal</i> destroyed by insects. Tillage good. Both grain and straw valued at high rates.
0 6	Do.	27 $\frac{1}{3}$	...	<i>Experiment No. 5</i> —Irrigated wheat, <i>Vájia</i> , on first class <i>besar</i> soil growing <i>bájri</i> or maize in the kharif season followed by wheat and occasionally barley as a second crop. A number of garden crops also grown on different parts of the field. Crop watered by a <i>kos</i> from a well in the field with ample water. Tillage careful. Outturn represents a 12-anna crop of the formulæ. By-product neither weighed nor valued.
0 8	Do.	27 $\frac{1}{3}$	2 $\frac{5}{7}$	<i>Experiment No. 6</i> —Gram on <i>besar gorádu</i> soil growing, without manure, rice followed by gram every year. Rice was this year sown late and seedlings withered for want of rain before transplantation. The field has a well, but it is not reported whether the crop was irrigated. The outturn is more than bumper for a dry crop according to formulæ. Both grain and by-product valued high.
0 10	Do.	27 $\frac{1}{3}$	5 $\frac{5}{7}$	<i>Experiment No. 7</i> —Dry-crop wheat, <i>Chásia</i> , on fair black soil growing, without manure, wheat, <i>jowár</i> and cotton in rotation. Season favourable and tillage good. Outturn middling and perhaps overestimated at 9 annas.
0 10	Do.	23 $\frac{2}{3}$	...	<i>Experiment No. 8</i> — <i>Pótalia</i> wheat on lowly assessed field, classed as <i>bdgáyat</i> , and growing without any manure, <i>bájri</i> , <i>jowár</i> and wheat in rotation. Test crop probably irrigated, but the means and extent of irrigation not reported. Season, &c., as above. Grain priced high. By-product regarded as useless for fodder and therefore neither weighed nor valued.
0 10	Do.	29 $\frac{1}{2}$	7 $\frac{3}{4}$	<i>Experiment No. 9</i> —Gram, unirrigated and unmanured, on poorer black soil field growing gram, wheat and cotton in rotation. Season, &c., as above. Yield overestimated at 10 annas. Market rate for grain high.
0 8	Do.	27 $\frac{1}{3}$	1 $\frac{6}{7}$ straw, 3 $\frac{1}{2}$ chaff.	<i>Experiment No. 10</i> — <i>Bájri</i> mixed with pulse on good dry-crop land growing the same crops year after year. Field manured with 6 carts of ordinary manure. Season favourable and tillage good. Subordinate crops unripe at date of test and therefore were not tested. Both grain and straw valued high.
0 8	Do.	24 $\frac{1}{3}$	1 $\frac{1}{4}$ straw, 3 $\frac{1}{2}$ chaff.	<i>Experiment No. 11</i> —Do. do. do. Grain valued higher than in the above case. A poor crop.



Summary of Crop Experiment Reports,

O. S. = Original Survey ;

No.	District, Taluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formula.	AVERAGE PER ACRE.					
					Seed.	Yield of		Total Value of Outturn.	Assessment excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.
						Principal Product.	By-product.			
1	2	3	4	5	6	7	8	9	10	11
	KAIRA—continued. <i>Mr. B. E. Modi, District Deputy Collector.</i>		Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent
12	Mátar (Vansar) ...	Spiked millet (Bájrí), 4th October 1897.	10	810	8	124	510	6 5 3	4 8 11 R. S.	72.01
13	Anand (Umreth) ...	Eleusine coracana (Bávto), 22nd October 1897.	12	1,650	6	1,323	3,645	42 13 0	6 10 8 R. S.	15.57
14	Do. (do.) ...	Paspalum scrobiculatum (Kodra), 28th October 1897.	10	1,190	12	338	1,175	8 9 0	5 11 5 R. S.	66.89
15	Mátar (Sokhda) ...	Wheat (Kátha), 21st February 1898.	12	1,500	100	1,297	1,025	51 0 0	7 8 0 R. S.	14.71
16	Do. (Mátar) ...	Do. (white), 23rd February 1898.	14	1,050	85	1,243	1,300	55 0 5	6 14 9 R. S.	12.58
17	Do. (Tráj) ...	Do. (Kátha), 24th February 1898.	13	975	85	738	405	28 14 6	5 1 7 R. S.	17.63
18	Do. (do.) ...	Do. (white), 24th February 1898.	13	975	85	554	390	24 4 0	3 10 7 R. S.	15.14
	PANCH MAHA'LS. <i>Mr. J. A. G. Wales, Assistant Collector.</i>									
19	Godhra (Popatpura) ...	Paspalum scrobiculatum (Kodra), 20th October 1897.	9	960	17	1,179	...	31 1 1	0 6 10 O. S.	1.37
20	Do. (Kántda) ...	Do. do. 23rd October 1897.	3	320	17	367	...	9 10 7	0 12 0 O. S.	7.76
21	Do. (Godhra) ...	Spiked millet (Bájrí Salapdi), 21st October 1897.	9	620	15½	344	2,406	24 15 7	1 2 10 O. S.	4.71
	<i>Mr. Pránálal Harkisandás, District Deputy Collector.</i>									
22	Godhra (Ratanpur) ...	Do. do. 16th November 1897.	10	690	18	1,095	4,072	60 1 6	2 3 3 O. S.	3.66
	<i>Mr. S. M. Bharucha, District Deputy Collector.</i>									
23	Dohad (Jhálod) ...	Sesamum (Tal), 15th December 1897.	10	400	14	292 seed.	656	12 2 0	2 5 8 R. S.	19.41
24	Do. (Dohad) ...	Rapeseed (Sarsav), 1st March 1898.	12	600	4½	501 do.	927	23 11 10	1 0 8 R. S.	4.38

Northern Division, 1897-98—continued.

R. S.=Revision Survey.

Area of Test.	Equivalent in Tolas of local measure Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
		Principal Product.	By-Product.	
12	13	14	15	16
A. g.	Tolas.	Lbs.	Cwts.	
0 8	40 (weight).	29 $\frac{4}{5}$	2 $\frac{1}{14}$	<i>Experiment No. 12.</i> — <i>Bajri</i> mixed with <i>math</i> on sandy alluvial <i>gorât</i> soil: The field manured with about 15 carts of cowdung three years ago. (1) <i>Kodra</i> with <i>tuver</i> , (2) castors and (3) <i>kodra</i> with <i>tuver</i> grown during the preceding three years. Season unfavourable, rains being late at commencement and incessant later on. Tillage indifferent. Outturn very poor and much overestimated at 10 annas.
0 8	Do.	32 $\frac{4}{5}$	13	<i>Experiment No. 13.</i> — <i>Bávto</i> on <i>gorâdu</i> land growing, during the past three years, (1) <i>kodra</i> , (2) <i>kodra</i> with <i>tuver</i> and (3) <i>bávto</i> . Field lightly dressed with 8 carts of ordinary manure last year. Season favourable; and tillage good. Outturn 10 annas of the formulæ standard. <i>Math</i> was sown mixed with the <i>bávto</i> but was not tested.
0 8	Do.	41	33 $\frac{4}{7}$	<i>Experiment No. 14.</i> — <i>Kodra</i> on similar land growing (1) <i>kodra</i> , (2) <i>kodra</i> and <i>tuver</i> and (3) <i>bávto</i> during the past three years. 6 carts of manure applied per acre annually. Season and tillage as above. Outturn poor. Pulses sown mixed with the <i>kodra</i> not tested.
0 8	Do.	26 $\frac{1}{4}$	5 $\frac{5}{7}$	<i>Experiment No. 15.</i> —Wheat, <i>Kátha</i> , on rich <i>besar</i> soil. Paddy followed by wheat grown in the previous year, wheat alone in the two years before that. No manure used for the past two years. Season favourable; and tillage good. Land watered once before sowing and once a month after. Outturn represents a 10-anna yield of the formulæ.
0 10	Do.	23 $\frac{2}{5}$	5 $\frac{6}{7}$	<i>Experiment No. 16.</i> —White wheat on good black soil which grew, during the previous year, rice and wheat during the two years preceding that. This year's wheat apparently the sole crop of the year. Last year the field manured with 30 carts of ordinary manure per acre. Season and tillage as above. Outturn full maximum of the formulæ. Seed-rate high. Grain valued very high.
0 8	Do.	20 $\frac{1}{4}$	4 $\frac{4}{7}$	<i>Experiment No. 17.</i> — <i>Kátha</i> wheat grown continuously on good black soil. Field manured with 40 cart-loads of farm-yard manure two years ago. Season and tillage as above. Outturn 10 annas of the formulæ.
0 8	Do.	23 $\frac{2}{5}$	5 $\frac{4}{7}$	<i>Experiment No. 18.</i> —White wheat on slightly lowly assessed field under conditions as above. Grain valued very high.
0 8	Do.	38	...	<i>Experiment No. 19.</i> — <i>Kodra</i> mixed with <i>tal</i> on a <i>gorâdu</i> soil field newly brought under tillage. The test crop the first on the field. Season favourable; and tillage good.
0 8	Do.	38	...	<i>Experiment No. 20.</i> — <i>Kodra</i> , sole crop, on <i>gorâdu</i> land which lay fallow in the previous year. Season, &c., as above. Outturn poor.
0 8	Do.	29 $\frac{3}{4}$	1 $\frac{4}{7}$	<i>Experiment No. 21.</i> — <i>Bájri</i> on a more highly assessed <i>gorâdu</i> field which grew the same crop in the previous year and was manured with 8 to 9 carts of cattledung per acre. Season and tillage good. Crop poor. By-product valued very high.
0 8	Do.	29 $\frac{3}{4}$	1 $\frac{4}{7}$	<i>Experiment No. 22.</i> —Same crop on good <i>gorâdu</i> land manured with 20 carts of cowdung per acre. Same crop grown during the previous two years and sugarcane before that with the assistance of well water from a neighbouring field. Season and tillage both good. Outturn full maximum. By-product valued very high as in the above test.
0 10	Do.	24 $\frac{3}{5}$	23 $\frac{3}{7}$	<i>Experiment No. 23.</i> —Sesamum on light-brown <i>gorâdu</i> land manured with about 6 carts of cattledung. Maize followed by gram usually grown. Last year maize seedlings destroyed by insects. Hence <i>til</i> sown this year rather late after the time of appearance of the insects had passed. Rain after sowing deficient. Tillage indifferent. Seed-rate high. Outturn 7 annas of the formulæ.
0 10	Do.	21 $\frac{12}{5}$	16 $\frac{4}{7}$	<i>Experiment No. 24.</i> —Rapeseed on reddish brown soil growing maize followed by rapeseed every year. Field manured for the first crop with about 13 carts per acre of cowdung. Late rains deficient. Cultivation indifferent. Outturn 10 annas. Incidence on the second crop only.

Summary of Crop Experiment Reports,

O. S. = Original Survey ;

No.	District, Taluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formulae.	AVERAGE PER ACRE.					
					Seed.	Yield of		Total Value of Outturn.	Assessment excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.
						Principal Product.	By Product.			
1	2	3	4	5	6	7	8	9	10	11
	PANCH MAHA'LS— <i>continued.</i> <i>Mr. S. M. Bharucha,</i> <i>District Deputy Collector</i> <i>—continued.</i>		Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.
25	Dohad (Dohad) ...	Wheat (Vája), 14th March 1898.	6	675	144	431	533	15 9 0	2 8 0 R. S.	16.06
26	Do. (Devánia) ...	Do. (white Kátha), 17th March 1898.	6	675	103	906	884	41 4 8	1 0 0 R. S.	2.42
	BROACH. <i>Mr. H. L. Painter, Assist-</i> <i>ant Collector.</i>									
27	Broach (Dungri) ...	Great millet (Jowár), 1st January 1898.	5	500	10	324	230 bun- dles kadbi, 21 chaff.	14 2 1	6 0 11 O. S.	42.60
28	Do. (Kásad) ...	Chickling vetch (Láng), 26th February 1898.	4	225	41	800	600	21 2 2	6 1 0 O. S.	28.74
29	Do. (Cholád) ...	Gram, 11th March 1898.	5	250	41	263	100	12 13 0	4 10 0 O. S.	36.09
30	Do. (Kásad) ...	Wheat, 28th February 1898.	6	490	51	356	316	19 6 3	6 0 8 O. S.	31.03
	<i>Mr. Sorabshah Hormusji,</i> <i>District Deputy Collector.</i>									
31	Ankleshvar (Andáda) ...	Sesamum (Tal), 1st February 1898.	16	800	1	341 seed	...	20 12 0	4 13 10 O. S.	23.44
32	Do. (Ankleshvar)...	Do., 3rd February 1898.	12	600	1	205 do.	...	12 8 0	4 1 6 O. S.	32.75
33	Do. (Pándavi) ...	Wheat (Hánsia), 20th February 1898.	15	1,220	51	406	410	26 0 2	3 8 11 O. S.	13.67
34	Do. (Dungra) ...	Do. ..	12	975	51	378	395	24 4 10	4 5 5 O. S.	17.84
35	Do. (Utráj) ...	Great millet (Jowár), 10th March 1898.	18	1,570	8	894	1,770 kadbi, 165 chaff.	30 14 11	5 2 0 O. S.	16.58
36	Do. (do.) ...	Do. ...	15	1,310	8	619	1,775 kadbi, 110 chaff.	22 9 7	4 5 6 O. S.	19.23

Northern Division, 1897-98—continued.

R. S. = Revision Survey.

Area of Test.	Equivalent in Tolas of local measure Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
		Principal Product.	By Product.	
12	13	14	15	16
A. g.	Tolas.	Lbs.	Cwts.	
0 8	40 (weight.)	28 $\frac{1}{8}$	12 $\frac{4}{7}$	<i>Experiment No. 25.</i> —Wheat, <i>Vájiá</i> , as a second crop after maize, on brown black soil. No manure used for the past few years. Rain ceased early and the crop suffered from deficiency of moisture. Cultivation indifferent. Seed-rate very high.
0 8	Do. ...	22 $\frac{1}{8}$	15 $\frac{5}{7}$	<i>Experiment No. 26.</i> —Wheat, white <i>Káthá</i> , as a sole crop on deep black soil. Hemp seed sown early in the season and ploughed in to serve as manure. Season, &c., as above; and outturn more than double than in the above test. Seed-rate very high.
0 8	Do. ...	35 $\frac{7}{8}$	100 bun- dles kadbi, $\frac{11}{28}$ chaff.	<i>Experiment No. 27.</i> —Kharif <i>jowár</i> on a highly assessed black-soil field growing <i>jowár</i> and cotton in alternate years. Field manured with 20 carts of cowdung every other year. Season only fair. Tillage good. Outturn very poor. Incidence high owing to poor yield.
0 8	Do. ...	48 $\frac{7}{10}$	1 $\frac{1}{2}$	<i>Experiment No. 28.</i> — <i>Láng</i> on similar soil growing rice and cotton mixed in one year and <i>láng</i> in the other. Season, &c., as above. Outturn represents a middling crop.
0 8	Do. ...	20 $\frac{1}{2}$	...	<i>Experiment No. 29.</i> —Gram on black soil assessed at a lower rate than other fields selected by the experimenter. Following crops grown during the past five years:—(1) <i>láng</i> , (2) wheat, (3) cotton, (4) rice and (5) wheat. Other conditions as above. Pulse valued at high market rate. Outturn poor and probably correctly estimated at 8 annas.
0 19	Do. ...	19 $\frac{1}{8}$	1 $\frac{4}{7}$	<i>Experiment No. 30.</i> —Wheat on highly assessed black soil, which usually grows <i>láng</i> and cotton, and wheat only occasionally. Other conditions as above. Grain priced at a very high rate.
0 10	Do. ...	16 $\frac{2}{5}$	...	<i>Experiment No. 31.</i> —Sesamum on a good black-soil field growing <i>jowár</i> in the previous year preceded by cotton in the two preceding years. Field manured with 12 carts of farm-yard manure per acre. Season favourable and tillage good. Crop overestimated at the 16-anna standard.
0 10	Do. ...	16 $\frac{2}{5}$	...	<i>Experiment No. 32.</i> —Same crop on similar soil mixed with a little <i>kankar</i> . Wheat and cotton preceded the test crop. Cotton sown failed owing to excessive rain, and sesamum grown at last. About 11 carts of manure applied per acre. Later rains deficient. Tillage careful. Outturn overestimated at 12 annas.
0 10	Do. ...	17 $\frac{1}{4}$	1 $\frac{1}{2}$	<i>Experiment No. 33.</i> —Dry-crop wheat, <i>Hásia</i> , on <i>basri</i> soil growing cotton and wheat in alternate years. Field not manured in the present year, but last year got 13 carts of farm-yard manure and 5,000 sheep were folded thereon for three nights. Season favourable; and tillage careful. Local anna estimate high. Grain valued very dear.
0 10	Do. ...	17 $\frac{1}{4}$	1 $\frac{1}{2}$	<i>Experiment No. 34.</i> —Do. do. Field manured with about 8 carts per acre. Other remarks as above.
0 8	Do. ...	32 $\frac{2}{5}$	6 $\frac{5}{8}$ kadbi, $\frac{11}{2}$ chaff.	<i>Experiment No. 35.</i> —Rabi <i>jowár</i> on good black-soil field growing cotton alternately with wheat or <i>jowár</i> . 20 carts of ordinary manure used per acre. Season favourable; and tillage good. Crop considerably benefited by rain in February. Local anna estimate much too high.
0 8	Do. ...	32 $\frac{2}{5}$	5 $\frac{7}{8}$ kadbi, $\frac{11}{2}$ chaff.	<i>Experiment No. 36.</i> —Do. do. Field not manured for last five years. Other conditions and remarks as in the above test.

Summary of Crop Experiment Reports,

O. S.=Original Survey;

No.	District, Taluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formula.	AVERAGE PER ACRE.					
					Seed.	Yield of		Total Value of Outturn.	Assessment excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.
						Principal Product.	By-Product.			
1	2	3	4	5	6	7	8	9	10	11
			Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.
	BROACH—continued.									
	<i>Mr. P. R. Mehta, Assistant Superintendent, Gujarat Revenue Survey.</i>									
37	Vagra (Sutrel) ...	Chickling Vetch (Láng), 13th February 1898.	10	440	40	496	1,044	20 2 8	4 8 7 O. S.	22.49
38	Do. (Vahíal) ...	Do. 14th February 1898.	5	220	35	258	820	13 0 6	4 7 5 O. S.	34.25
	<i>Mr. J. W. Mollison, Deputy Director of Agriculture.</i>									
39	Broach (Chamárgám) ...	Do. do. 8th February 1898.	14 or 15	790 to 850	41	1,068	1,220	40 13 0	6 1 10 O. S.	14.98
40	Do. (do.) ...	Do. do.	10	560	45 to 51	610	1,100	25 12 4	5 3 2 O. S.	20.17
41	Ankleshvar (Hánsot) ...	Wheat, 3rd March 1898.	16	1,300	60	881	931	44 6 10	4 13 7 O. S.	10.91
42	Do. (do.) ...	Do. do. ...	14	1,140	60	500	410	24 11 6	5 7 2 O. S.	22.04
43	Do. (do.) ...	Do. do. ...	11 or 12	890 or 975	57	380	335	18 14 2	5 12 0 O. S.	30.44
44	Do. (Utráj) ...	Do. 4th March 1898.	14	1,140	50	510	260	24 8 10	3 11 11 O. S.	15.25
45	Do. (do.) ...	Do. do. ...	9 or 10	730 or 810	40	265	255	13 4 2	4 4 10 O. S.	32.44
46	Broach (Chamárgám) ...	Cotton, 11th February 1898 to 6th April 1898.	10 to 11	375 to 410	8	334 seed cotton	...	22 14 9	5 2 11 O. S.	22.60
47	Do. (do.) ...	Do. 11th February 1898 to 10th April 1898.	14	525	8	446 do.	...	30 9 8	5 7 0 O. S.	17.76
48	Do. (Kisnáđ) ...	Do. 7th February 1898 to 26th March 1898.	8	300	6	265 do.	...	18 2 11	5 3 10 O. S.	28.81
49	Do. (do.) ...	Do. 7th February to 26th March 1898.	14	525	8	400 do.	...	27 7 2	5 6 10 O. S.	19.77

Northern Division, 1897-98—continued.

R. S. = Revision Survey.

Area of Test.	Equivalent in Tolas of local measure Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
		Principal Product.	By-Product.	
12	13	14	15	16
A. g.	Tolas.	Lbs.	Cwts.	
0 10	40 (weight)	46 $\frac{7}{8}$	1	Experiment No. 37.— <i>Lang</i> on a good black soil—field growing <i>la'ng</i> and cotton in alternate years. No manure applied. Season favourable at first, but cloudy weather in January brought on insects, which damaged the crop considerably. Tillage fair. Anna estimate high.
0 10	Do.	46 $\frac{7}{8}$	1	Experiment No. 38.— Do. do. Rice sown mixed with cotton on this field in the previous year. Other conditions as above. Outturn very poor.
0 8	Do.	32	1 $\frac{1}{2}$	Experiment No. 39.— <i>La'ng</i> on good black soil, which occupies a lowlying situation, and therefore liable to be awamped during heavy rains, manured with about 6 carts of ordinary manure per acre. Cotton and <i>jowar</i> grown during the previous two years. Season favourable; and tillage careful. Crop slightly injured by insects. Outturn full maximum of the formula.
0 8	Do.	32	1 $\frac{1}{2}$	Experiment No. 40.—Same crop on similar but unmanured field which grew <i>tal</i> and <i>jowar</i> during the past two seasons. Season, &c., as above. Crop attacked by insects to a greater extent than in the above case, which affected outturn.
0 7.13	Do.	21 $\frac{7}{10}$	2 $\frac{1}{7}$	Experiment No. 41.—Dry-crop wheat on unmanured black soil which grew cotton during the past two seasons. The land was lying under grass seven years ago. Field prepared for <i>jowar</i> , but heavy rain having destroyed seed, wheat was sown instead. Tillage careful. Season good and crop materially helped by rain in February.
0 8	Do.	21 $\frac{7}{10}$	2 $\frac{1}{7}$	Experiment No. 42.— Do. do. Land manured with 16 carts of farm-yard manure per acre in the previous year. <i>Jowar</i> and cotton grown during the past two years. Season as above. Tillage good average.
0 8	Do.	21 $\frac{7}{10}$	2 $\frac{1}{7}$	Experiment No. 43.— Do. do. Field not manured for the past four years. It grows wheat and cotton in rotation. Season as above. Incidence rather high.
0 8	Do.	21 $\frac{7}{10}$	2 $\frac{1}{7}$	Experiment No. 44.—Same crop on black soil growing <i>jowar</i> or wheat alternately with cotton. Land stated to have been manured in the previous season, but little evidence of this having been done. Season and tillage as above.
0 8	Do.	21 $\frac{7}{10}$	2 $\frac{1}{7}$	Experiment No. 45.— Do. do. Field stated to have been manured with 20 carts per acre, but this very doubtful. Cotton and wheat grown in alternate years. Season, &c., as above, but crop poor. Incidence high.
0 11.25	Do.	14 $\frac{1}{2}$	...	Experiment No. 46.—Indigenous cotton on good black <i>besar</i> soil growing cotton and rice mixed every other year with fallow in the interval. Field said to have been manured, but showed no signs of it. Season favourable and cultivation good. Rice not tested but said to have yielded an average crop. Incidence on cotton alone.
0 4.31	Do.	14 $\frac{1}{2}$	...	Experiment No. 47.— Do. do. do. Field allowed rest in the past year before which (1) <i>la'ng</i> and (2) <i>tal</i> and <i>tuber</i> taken during two years. Season, &c., as above. Incidence on cotton alone, the rice mixed with it not being tested.
0 9.6	Do.	14 $\frac{1}{2}$	...	Experiment No. 48.— Do. do. do. Field not manured for the past eight years and grew (1) <i>tal</i> , (2) cotton and (3) <i>jowar</i> with fallow during the preceding three years. Rains commenced late. Tillage indifferent; field weedy. Outturn poor. Yield of untested rice not taken into account in calculating the incidence.
0 9.95	Do.	14 $\frac{1}{2}$	...	Experiment No. 49.—Same crop on good black land that was under grass previous to 1895-96. Wheat grown during the preceding year. Field not manured. Season favourable; and tillage good. Outturn exclusive of the untested rice.

Summary of Crop Experiment Reports,

O. S.=Original Survey;

No.	District, Taluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formula.	AVERAGE PER ACRE.					
					Seed.	Yield of		Total Value of Outturn.	Assessment excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.
						Principal Product	By-Product.			
1	2	3	4	5	6	7	8	9	10	11
BROACH—continued.			Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.
<i>Mr. J. W. Mollison, Deputy Director of Agriculture—continued.</i>										
50	Broach (Kisnád) ...	Cotton, 7th February to 26th March 1898.	12	450	8	378 seed cotton	...	25 15 0	5 10 0 O. S.	21.68
51	Do. (Derol) ...	Great millet (Shiálu Jowár), 14th March 1898.	12	1,050	6	1,199	476 bundles kadbi, 245 chaff.	47 1 6	5 10 11 O. S.	12.06
52	Do. (do.) ...	Do. do. ...	10	875	10	925	615 bundles kadbi, 180 chaff.	41 4 0	5 15 2 O. S.	14.42
53	Ankleshvar (Kápodra) ...	Do. 18th March 1898.	8	700	6	461	514 bundles.	19 3 1	3 3 6 O. S.	16.77
54	Do. (do.) ...	Do. do. ...	10	875	4½	660	660 bundles.	26 11 6	3 6 5 O. S.	12.72
55	Do. (do.) ...	Do. do. ...	10	875	7	623	520 bundles.	24 3 1	3 3 3 O. S.	13.24
56	Do. (Umarváda) ...	Do. 22nd March 1898.	14	1,225	10	925	490 bundles kadbi, 180 chaff.	33 13 7	3 5 4 O. S.	9.84
57	Do. (do.) ...	Do. do. ...	14	1,225	10	868	471 bundles kadbi, 147 chaff.	31 12 7	3 1 0 O. S.	9.63
THANA.										
<i>Mr. C. W. M. Hudson, Assistant Collector.</i>										
58	Bassein (Malode) ...	Crotolaria juncea (San), 21st November 1897.	...	...	64 sers.	55 d. s.	...	24 1 0	2 2 7 O. S.	8.98

Northern Division, 1897-98—continued.

R. S.—Revision Survey.

Area of Test.	Equivalent in Tolas of local measure Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
		Principal Product.	By-Product.	
12	13	14	15	16
A. g.	Tolas.	Lbs.	Owts.	
0 10·15	40 (weight.)	14½	...	<i>Experiment No. 50.</i> —Indigenous cotton on similar soil manured with 12 to 14 carts of ordinary manure per acre and with folding sheep. Cotton and rice mixed taken in alternate years with fallow in the interval. Season, &c., as above.
0 8·31	Do.	32½	50 bundles kadbi, 2½ chaff.	<i>Experiment No. 51.</i> — <i>Shidlu jowdr</i> on good black soil, not manured for the past three years, and which lay fallow during the previous year and grew cotton before that. Season somewhat unfavourable. Sowings belated by heavy rain in September. The test crop sown in time and escaped much injury. Tillage careful.
0 8	Do.	32½	Do.	<i>Experiment No. 52.</i> — Do. do. Field unmanured for many years. <i>Leng</i> and <i>tal</i> taken during preceding two years. Season, &c., as above.
0 8·25	Do.	32½	100 bundles.	<i>Experiment No. 53.</i> —Same crop on shallow black soil containing a considerable admixture of lime which has received no manure during the past five or six years and grew the same crop last season preceded by cotton. Seed sown a month later than usual owing to heavy rains at usual sowing time. Crop benefited by late rains in February. Tillage good.
0 8	Do.	32½	100 bundles.	<i>Experiment No. 54.</i> — Do. do. Land manured in the previous year with 10 carts per acre of farm-yard manure. Season, &c., as above. <i>Jowdr</i> and <i>tal</i> taken during the past two years.
0 7	Do.	32½	Do.	<i>Experiment No. 55.</i> — Do. do. Field manured three years ago. <i>Jowdr</i> and cotton grown in alternate years.
0 8	Do.	32½	100 bundles kadbi, 2½ chaff.	<i>Experiment No. 56.</i> —Same crop on shallow black soil mixed with sand and lime, manured with about 20 loads per acre, (1) <i>jowdr</i> , (2) <i>tal</i> and (3) cotton grown in rotation. Season, &c., as above.
0 8·16	Do.	32½	100 bundles kadbi, 2½ chaff.	<i>Experiment No. 57.</i> — Do. do. Land manured with about 12 loads per acre in the previous year. <i>Jowdr</i> and <i>tal</i> taken in alternate years. Season, &c., as above.
0 8	...	2½	...	<i>Experiment No. 58.</i> — <i>Tdg, san</i> , on a dark sandy loam soil, classed as <i>bdgdyat</i> , growing rice and a number of garden crops every year. Season favourable. Crop needed no care after sowing and was not in local estimation a good one.

Summary of Crop Experiment Reports,

O. S. = Original Survey ;

No.	District, Táluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formula.	AVERAGE PER ACRE.					
					Seed.	Yield of		Total Value of Outturn.	Assessment excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.
						Principal Product.	By-Product.			
1	2	3	4	5	6	7	8	9	10	11
	THA'NA—continued.		Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.
	<i>Mr. W. C. Shepherd, Assistant Collector.</i>									
59	Kalyán (Belawli) ...	Eleusine coracana (Nágli), 19th October 1897.	16	1,000	$\frac{3}{8}$	985	...	24 3 10	0 8 4 R. S.	2.14
	<i>Mr. V. S. Nābar, District Deputy Collector.</i>									
60	Bhivandi (Bhivandi) ...	Rice (Dodka), 27th October 1897.	16	2,500	56	2,379 in husk.	2,470	65 4 1	6 3 3 R. S.	9.51
	<i>Mr. W. D. Wilkins, Assistant Superintendent, Konkan Revenue Survey.</i>									
61	Dáhānu (Phanse) ...	Wheat (Pote), 15th March 1898.	12	...	70	816	920	55 0 0	5 3 0 O. S.	9.43
	<i>Mr. H. V. Sáthe, Assistant Superintendent, Konkan Revenue Survey.</i>									
62	Dáhānu (Zai) ...	Castor seed, 4th March 1898.	9	300	39	262 seed.	...	11 14 10	0 3 11 O. S.	2.05
63	Do. (Deheri) ...	Do. 28th March 1898.	9	300	$45\frac{1}{2}$	179 do.	...	8 2 10	0 3 4 O. S.	2.54
64	Do. (do.) ...	Gram, 7th March 1898.	11	360	72	732	...	58 4 6	0 4 0 O. S.	0.42
65	Do. (Udve) ...	Castor seed, 21st March 1898.	8	210	$17\frac{1}{2}$	236 seed.	...	10 11 8	1 9 4 O. S.	14.75
66	Do. (do.) ...	Gram, 21st March 1898.	6	100	11	285	...	22 10 6	1 8 6 O. S.	6.75

Northern Division, 1897-98—concluded.

R. S. = Revision Survey.

Area of Test.	Equivalent in Tolas of local measure Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
		Principal Product.	By-Product.	
12	13	14	15	16
A. g.	Tolas.	Lbs.	Cwts.	
0 8 $\frac{1}{4}$	66	40 $\frac{3}{5}$	...	<i>Experiment No. 59.</i> — <i>Nāgli</i> on first class <i>varkas</i> land growing (1) <i>nāgli</i> , (2) <i>vari</i> and (3) <i>nigerseed</i> after two years of rest. Seed-bed <i>rābed</i> as usual. The seed-rate is not sufficient. Season exceptionally good and tillage excellent. By-product not valued, being useless. Outturn good.
0 4	54 $\frac{1}{4}$	41	3	<i>Experiment No. 60.</i> —Rice, <i>Dodka</i> , on <i>kharif nimgarva</i> land, growing the same crop year after year. No manure is used for the field, but the seed-bed, 3 <i>gunthas</i> per acre of field, <i>rābed</i> with 6 carts of <i>cowdung</i> and three of grass. Season excellent and tillage careful.
0 8	74	15 $\frac{1}{5}$	6 $\frac{4}{7}$	<i>Experiment No. 61.</i> —Wheat, <i>Pote</i> , on good black soil growing the same crop alternately with castors. No manure used. <i>San</i> , sown earlier in the season, was removed before sowing of wheat. Season good; and tillage also good. Outturn satisfactory.
0 8	53 $\frac{1}{2}$	22	...	<i>Experiment No. 62.</i> —Castor seed on brownish black <i>mānvat varkas</i> land growing castor and <i>kodra</i> without any manure after three years of rest on part of the field, the remainder being under grass used for fodder and <i>rāb</i> purposes. Season and tillage good. Seed-rate high.
0 8	53 $\frac{1}{2}$	22	...	<i>Experiment No. 63.</i> —Do. do. do.
0 8	70	12 $\frac{1}{2}$	...	<i>Experiment No. 64.</i> —Gram on light black <i>chikanvat</i> soil. Field low-lying and quite close to a tank and therefore usually waterlogged during the monsoon. Rice grown whenever possible, otherwise gram. Season and tillage as above. Seed-rate high. Outturn satisfactory. Pulse valued very high.
0 8	53 $\frac{1}{2}$	22	...	<i>Experiment No. 65.</i> —Castor seed on brownish black <i>barai</i> soil growing rice every year and castors as a second crop only once in five or six years. No manure used, but the test area formed a seed-bed for rice and, therefore, <i>rābed</i> as usual. Season favourable, but tillage indifferent. Incidence on second crop alone.
0 8	70	12 $\frac{1}{2}$	...	<i>Experiment No. 66.</i> —Gram as a second crop on light black <i>chikanvat</i> soil growing rice every year and gram only occasionally. No manure applied. Tillage and season as above. Pulse valued at an extremely high rate.

Summary of Crop Experiment Reports,

O. S. = Original Survey ;

No.	District, Taluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formulae.	AVERAGE PER ACRE.					
					Seed.	Yield of		Total Value of Produce.	Assessment, excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.
						Principal Product.	By-Product.			
1	2	3	4	5	6	7	8	9	10	11
	KHANDESH.		Annas	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.
	<i>Mr. G. W. Hatch, Assistant Collector.</i>									
67	Jalgaon (Asode) ...	Wheat (Káthe and Bansi mixed), 14th February 1898.	14	900	60	490	460	21 4 0	3 6 1 R. S.	15.90
68	Do. (do.) ...	Do. do. 14th February 1898.	14	900	60	565	410	24 6 0	3 6 7 R. S.	18.99
	<i>Mr. F. J. Varley, Assistant Collector.</i>									
69	Sindkheda (Virdel) ...	Wheat (Gore), 1st March 1898.	6	200	62	183	318	11 14 5	2 8 0 R. S.	21.00
	<i>Mr. S. C. Joshi, District Deputy Collector.</i>									
70	Chálisgaon (Pimpri) ...	Spiked millet (Bá-j-ri), 16th November 1897.	9	400	5½	303	335 bundles.	18 2 4	1 6 10 R. S.	7.89
71	Do. (Kharjai) ...	Do. do. 8th November 1897.	10	500	5½	270	365 bundles.	16 10 10	1 12 9 R. S.	10.78
72	Páchora (Bhadgaon) ...	Great millet (Gari Jowári), 3rd December 1897.	9	700	6½	558	260 bundles.	21 12 4	3 0 2 R. S.	13.82
73	Chálisgaon (Pilkhod) ...	Wheat (Botka) ...	9	675	126	1,461	1,900	62 13 0	1 7 5 R. S.	2.33
74	Do. (do.) ...	Do. (Kusali).	8	475	126	1,229	1,008	53 14 6	1 12 11 R. S.	3.35
	<i>Mr. F. B. Young, Superintendent, Land Records and Agriculture, C. D.</i>									
75	Sindkheda (Pátan) ...	Do. (Bansi), 18th February 1898.	9	500	78	720	925	47 5 11	2 11 5 R. S.	5.72
76	Shirpur (Amode)...	Do. do. 25th February 1898.	9	675	84	1,181	1,600	60 0 0	1 14 2 O. S.	3.14

Central Division, 1897-98.

R. S.—Revision Survey.

Area of Test.	Equivalent in Tolas of local measure Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
		Principal Product.	By-Product.	
12	13	14	15	16
A. g.	Tolas.	Lbs.	Cwts	
0 8	147	24	4 $\frac{3}{8}$	<i>Experiment No. 67.</i> —Dry-crop wheat, <i>Bansi</i> and <i>Katka</i> mixed, on black cotton soil. Wheat, coriander and cotton grown during the past three years. No manure applied to the test crop, though the previous year's cotton was treated with about 20 carts of cattledung per acre. Season favourable; and tillage fair. Only one sample of grain received for this and the following test, and it weighed nearly 10 <i>tolas</i> over the recorded weight. Grain valued high.
0 8	147	24	4	<i>Experiment No. 68.</i> —Dry-crop wheat raised continuously on similar field for the past four years. The field manured with 20 to 25 carts of cattledung per acre. Other remarks as above. Yield higher than in the above experiment and probably is correctly estimated at 14 annas, the formulæ yields for wheat in Khândesh being too high.
0 8	140	17 $\frac{2}{3}$	2 $\frac{1}{4}$	<i>Experiment No. 69.</i> —Same crop on unmanured slightly sandy black soil growing (1) wheat, (2) <i>bañri</i> and <i>math</i> , and (3) wheat during the past three years. Season favourable; and tillage good. Outturn, however, poor owing to poor nature of the soil and the experimenter having included part of the bed of a <i>nala</i> in his test area. Seed-rate high. Grain priced very high. Incidence also high.
0 8	141	37 $\frac{1}{2}$	30 bundles.	<i>Experiment No. 70.</i> — <i>Bañri</i> on slightly saltish black soil growing <i>bañri</i> and cotton in alternate years. No manure used for the past four years. Season fair; tillage good. Seed-rate only half the average. Outturn 8 annas according to the formulæ. By-product valued very high. Sample <i>ser</i> 7 <i>tolas</i> in excess of the reported weight.
0 8	148	40 $\frac{1}{2}$	36 bundles.	<i>Experiment No. 71.</i> —Same crop on similar soil mixed with <i>murum</i> . <i>Til</i> and <i>jowári</i> and cotton grown during the past two years. No manure applied. Other remarks as above.
0 8	128	45	28 bundles.	<i>Experiment No. 72.</i> —Kharif <i>jowári</i> on deep black soil manured with about 3 carts of cowdung per acre. (1) wheat and gram and (2) cotton grown during the past two seasons. Season, &c., as above. Sample <i>ser</i> 5 <i>tolas</i> in excess of the recorded weight.
0 8	154	28 $\frac{1}{2}$	3 $\frac{3}{4}$	<i>Experiment No. 73.</i> —Irrigated wheat, <i>Botka</i> , on light black soil manured with about 4 carts of cowdung per acre. The field is watered by means of a well, and grows <i>bañri</i> , wheat and a variety of garden crops, such as chillies, onions, sweet potatoes, &c. Season and tillage good. Seed-rate very high. Outturn full bumper according to the formulæ. Grain valued rather high. Sample <i>ser</i> exceeded the reported weight by 7 <i>tolas</i> .
0 8	147 $\frac{1}{2}$	24 $\frac{1}{4}$	2 $\frac{2}{7}$	<i>Experiment No. 74.</i> —Same crop of the <i>Kusali</i> variety on similar soil under similar conditions. Yield 15 annas of the formulæ.
0 8	144	16 $\frac{1}{3}$	1 $\frac{1}{4}$	<i>Experiment No. 75.</i> —Dry-crop wheat, <i>Bansi</i> , on good dark brown soil of full depth manured three years ago. Crops during the past three years were (1) cotton, (2) indigo and cotton, and (3) indigo. <i>Til</i> sown early in the season failed and ploughed in. Sowing rain favourable for wheat, but rainfall deficient later. Tillage good. Field quite clean. Seed-rate high. Out-turn 11 annas of the formulæ. Price of grain very high.
0 4	144	22 $\frac{1}{3}$	2 $\frac{1}{7}$	<i>Experiment No. 76.</i> —Irrigated wheat, <i>Bansi</i> , on similar field manured with 40 loads of stable-dung and town refuse. Cotton, wheat, <i>jowári</i> and a number of garden crops, such as sugarcane, chillies, plantains, tobacco &c., grown on different parts of the field. Crop irrigated by means of a well constructed six years ago, <i>Khondya</i> (<i>jowári</i>), sown early in the season, reaped in October and then the test crop sown. Tillage good. Outturn 13 annas of the formulæ.

Summary of Crop Experiment Reports,

O. S. = Original Survey;

No.	District, Táluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formula.	AVERAGE PER ACRE.					
					Seed.	Yield of		Total Value of Produce.	Assessment, excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.
						Principal Product.	By-Product.			
1	2	3	4	5	6	7	8	9	10	11
	KHA'NDESH—contd.		Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.
	<i>Mr. F. B. Young, Superintendent, L. R. and Agriculture, C. D.—continued.</i>									
77	Pimpalner (Bhádvi) ...	Wheat (Pote), 12th March 1898.	12 to 14	1,080 to 1,215	127	2,305	2,400	89 7 8	8 15 10 O. S.	10·04
78	Do. (Pimpalner) ...	Gram, 18th March 1898.	10	375	96	928	800	38 10 0	10 12 7 O. S.	27·92
	NA'SIK.									
	<i>Mr. A. H. A. Simcox, Assistant Collector.</i>									
79	Málegaon (Málegaon) ...	Cotton, 22nd November 1897.	3	30	20	197 seed-cotton.	...	10 5 8	1 7 3 R. S.	14·03
80	Do. (Vadgaon) ...	Groundnut (Bhui-mung), 30th January 1898.	10	2,300	12	1,050 seed.	1 cart-load.	33 0 0	6 7 5 R. S.	19·58
81	Do. (Málegaon) ...	Linseed (Alsi), 16th February 1898.	9	250	7 $\frac{2}{3}$	402 do.	1 $\frac{1}{4}$ cart-load.	17 8 0	1 11 8 R. S.	9·88
	<i>Mr. Pherozsháh Pestonji, District Deputy Collector.</i>									
82	Chándor (Shivre) ...	Gram, 23rd February 1898.	12	480	26	320	150	16 7 9	0 13 6 R. S.	5·11
	<i>Mr. F. B. Young, Superintendent, Land Records and Agriculture, C. D.</i>									
83	Báglán (Satáne) ...	Wheat (Lál Bansi), 24th March 1898.	14	1,215	91	2,347	3,000	109 2 8	0 13 11 O. S.	0·79
	AHMADNAGAR.									
	<i>Mr. Sorábjí Padamji, Assistant Collector.</i>									
84	Nagar (Sávedi) ...	Spiked Millet (Bájrí), 5th November 1897.	7	220	7	226	1,500 straw, 60 chaff.	14 1 0	0 12 5 R. S.	5·52

Central Division, 1897-98—continued.

R. S. = Revision Survey.

Area of Test.	Equivalent in Tolas of local measure Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
		Principal Product.	By-Product	
12	13	14	15	16
A. g.	Tolas.	Lbs.	Cwts.	
0 4	145	29 $\frac{3}{4}$	1 $\frac{1}{4}$	<i>Experiment No. 77.</i> —Irrigated wheat, <i>Pote</i> , on <i>pdtasthal</i> , good blackish soil growing (1) rice, (2) wheat, (3) wheat and (4) sugarcane. Field manured once in four years before the sowing of rice. Season favourable and tillage careful. Crop watered by a <i>pat</i> which draws its supply from the Kán river dammed by the Public Works Department. Water ample. Test crop the sole crop of the year; and yield excellent.
0 5	146	26 $\frac{1}{2}$	2 $\frac{1}{4}$	<i>Experiment No. 78.</i> —Irrigated gram on deep black, <i>pdtasthal</i> , soil irrigated from the Pánjra Water Works. Wheat grown during the past two seasons. 15 to 20 carts of stable dung and refuse applied in May, and <i>bajri</i> taken as a first crop. The test crop received only two waterings. Water-supply somewhat deficient. Seed-rate high.
0 10	80 (weight.)	19	...	<i>Experiment No. 77.</i> —Indigenous cotton on a gravelly black soil field which lies within cantonment limits and is therefore not assessed by the Survey Department, but the occupancy right of which is put to auction every third year. It grows (1) cotton, (2) <i>bajri</i> and (3) <i>til</i> or <i>kulthi</i> in rotation. Season poor. Early rains scant and the crop became stunted. Insects did further damage. No manure applied; otherwise tillage good. Crop tested in two pickings. Outturn 7 annas of the formulæ and underestimated at 3 annas.
0 10	Do.	32 $\frac{1}{2}$	1 cart-load.	<i>Experiment No. 80.</i> — <i>Bhuimug</i> on good black <i>pdtasthal</i> land. Field lightly dressed with about 6 carts of cowdung and household refuse per acre. Previous cropping not given, but rice and peas intended to be sown next year and <i>bajri</i> and <i>methi</i> the year after. Season favourable; and tillage good. The means and extent of irrigation not reported. Crop weighed when dry, but the sample <i>ser</i> sent to this office gave a reduction of 23 per cent. Outturn poor, being only half the formulæ standard for 10 annas. By-product valued very low at Re. 1 per acre.
0 34	128	23 $\frac{1}{2}$	4 cart-loads.	<i>Experiment No. 81.</i> —Linseed, <i>Alsi</i> , on a fairly good black soil field dressed with about 2 carts of farm-yard manure per acre. Rotation undefined. Season favourable; and tillage good. Outturn full average.
0 8	111	20	3 $\frac{1}{4}$	<i>Experiment No. 82.</i> —Unmanured and unirrigated gram on good black soil which usually grows wheat every year. Gram taken this year owing to dearth of wheat for seed. The season only fair on account of partial failure of late rains. Cultivation indifferent, the occupant giving more attention to his garden lands. Outturn 9 annas of the formulæ. Pulse valued rather high.
0 4	143	23 $\frac{1}{2}$	2 $\frac{1}{2}$	<i>Experiment No. 83.</i> —Irrigated wheat, <i>Lal Bansi</i> , grown as a second crop on a light indifferent black-soil field, which is watered by a <i>mot</i> from a private well. Rotation: (1) <i>bajri</i> and chillies, (2) cotton and <i>bajri</i> followed by <i>jowari</i> and maize. In the current year <i>bajri</i> , chillies and brinjals grown in the early season and wheat and gram followed. Field manured with 40 to 45 carts of farm-yard manure after the <i>bajri</i> harvest. Crop watered once a week and carefully weeded. Seed-rate high. Yield represents a very good crop. Grain valued rather high.
0 8	110	22 $\frac{1}{2}$	3 $\frac{1}{4}$ straw, 1 $\frac{5}{7}$ chaff.	<i>Experiment No. 84.</i> — <i>Bajri</i> on a light soil field that is not manured but enjoys the advantage of being close to the village. The field was fallow last year and grew <i>jowari</i> during the previous two years. Season fair, but seed sown late and the crop suffered for want of rain in October. <i>Mug</i> and <i>math</i> sown with the <i>bajri</i> came to nothing. Grain priced high. Sample <i>ser</i> 3 <i>tolas</i> short of the reported weight.

Summary of Crop Experiment Reports,

O. S. = Original Survey ;

No.	District, Táluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formula.	AVERAGE PER ACRE.					
					Seed.	Yield of		Total Value of Produce.	Assessment excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.
						Principal Product.	By-Product.			
1	2	3	4	5	6	7	8	9	10	11
	AHMADNAGAR—contd.		Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.
	<i>Mr. J. Ghosal, Assistant Collector.</i>									
85	Karjat (Karjat) ...	Great millet (Jowári), 28th February 1898.	9	600	22½	1,103	4,320	36 12 9	0 9 0 R. S.	1 52
86	Shrigonda (Loni Vyankath).	Do. 26th March 1898.	5	180	17	857	1,292	37 6 5	1 3 5 R. S.	3.24
	<i>Mr. N. K. Pendse, District Deputy Collector.</i>									
87	Kopargaon (Jalgaon) ..	Spiked millet (Bájrí), 16th November 1897.	6	140	2½	368	738	11 9 10	1 0 8 R. S.	8.98
88	Do. (do.) ...	Do. do. ...	9	350	2½	1,005	2,131	29 0 0	0 11 2 R. S.	2.40
89	Nevása (Mahálakshmi Hivre).	Great millet (Jowári), mixed with Safflower (Kardai), 5th March 1898.	7	355	15 1½	857 35	1,543 kadbi, 183 chaff.	23 7 4	0 15 5 R. S.	4.10
	<i>Mr. F. B. Young, Superintendent, Land Records and Agriculture, C. D.</i>									
90	Kopargaon (Sákuri) ...	Gram, 16th January 1898.	12	520	30½	£31	360	23 11 4	1 9 5 R. S.	5.53
	POONA.									
	<i>Mr. E. L. Sale, Assistant Collector.</i>									
91	Indápur (Indápur) ...	Great millet (Jowári) with Safflower (Kardai), 28th January 1898.	6	280	3½	263	405 bundles.	18 12 0	0 7 9 R. S.	2.58
92	Purandhar (Jejuri) ...	Wheat, 22nd February 1898.	8	315	18	428	...	21 11 6	0 9 4 R. S.	2.68
93	Do. (Sásvad) ...	Gram, 2nd March 1898.	10	375	152	1,010	...	34 1 0	10 0 0 R. S.	29.35
	<i>Mr. K. B. Deval, District Deputy Collector.</i>									
94	Mával (Vadgaon)...	Wheat (Káthe), 1st February 1898.	7	220	55	201	406	13 10 4	0 9 5 R. S.	4.31

Central Division, 1897-98—continued.

R. S.=Revision Survey.

Area of Test.	Equivalent in Tolas of local measure Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
		Principal Product.	By-Product.	
12	13	14	15	16
A. g.	Tolas.	Lbs.	Cwts.	
0 5	112	34½	8	Experiment No. 85.—Irrigated <i>jowári</i> on a black-soil field growing the same crop during the three previous years. Land manured with about 6½ carts of cowdung and refuse per acre. Season somewhat unfavourable, but crop watered from a well in the field. Tillage good. Seed-rate high. Outturn satisfactory. Sample <i>ser</i> exceeded the reported weight by 5½ <i>tolas</i> . By-product valued very cheap.
0 5	110	28½	1½	Experiment No. 86.— Do. do. Outturn ½ less than in the above case. Sample <i>ser</i> 7 <i>tolas</i> in excess of the recorded weight. Both grain and <i>kadói</i> valued high.
0 8	122	37½	3¾	Experiment No. 87.— <i>Báji</i> on a light soil field growing the same crop for the past three years with the addition of maize in the previous year. No manure applied in the present year, but the land received it in the year previous. Rain for sowing scanty; later on a break of six weeks affected the crop. Tillage fair. Field not weeded. Seed-rate low. Outturn 9 annas of the formulæ.
0 10	124	38½	7½	Experiment No. 88.—Do. do. do. Soil sandy black <i>kevtá</i> ; other conditions as above. Yield very satisfactory, 1½ times the bumper outturn of the formulæ.
0 10	116	47½	3 kadbi	Experiment No. 89.—Rabi <i>jowári</i> mixed with <i>kardai</i> on black <i>morvandi</i> soil growing the same crop with patches of linseed and gram every year. No manure ever used. Season somewhat unfavourable. Sowing rain favourable. Absence of late rains and blight at flowering stage unfavourably affected the outturn. Tillage good. Outturn more than 10 annas of the formulæ.
	92	54½	6½ chaff.	
0 10	115	20½	1½	Experiment No. 90.—Gram, unmanured and unirrigated, on a good deep black-soil field growing <i>báji</i> and mixtures followed by gram or wheat. Last year no crop taken, being a famine year. <i>Báji</i> of the current year failed and it was ploughed in and gram sown. There was some <i>kardai</i> and a sprinkling of <i>jowári</i> , but both being unripe, they were left untested. Grain valued very high.
0 8	79	22½	80 bundles.	Experiment No. 91.— <i>Jowári</i> mixed with <i>kardai</i> in the proportion of 6 rows of the former to 2 of the latter on poor stony dry-crop land. Nothing grown in 1896 owing to failure of rains; <i>jowári</i> during the previous two years. No manure applied. Rain after sowing absent, and affected the growth of the crop. <i>Kadbi</i> affected by <i>chikta</i> , mildew. Tillage fair. Seed-rate low. <i>Kardai</i> not ripe at the time of the test and therefore not tested. Its value, however, Rs. 1-14 per acre included in column 9. Sample <i>ser</i> gave an excess of 2½ <i>tolas</i> . Prices high.
0 8	99	20½	...	Experiment No. 92.—Unmanured and unirrigated wheat on similar soil which grew <i>jowári</i> during the past three years. Rain after sowing absent and crop became stunted in growth. Tillage fair. Seed-rate low. Sample <i>ser</i> gave in this office an excess of 5 <i>tolas</i> . Prices high.
0 4	105	29½	...	Experiment No. 93.—Gram on good black <i>bdgáyat</i> land irrigated both by <i>pát</i> and by a <i>mot</i> . Field manured with about 47 carts of farm-yard manure per acre. Rotation: (1) <i>báji</i> , (2) groundnut and (3) gram. Test crop watered from a well. Water-supply ample. Seed-rate very high. Outturn fairly good for an irrigated crop. Pulse valued rather high. Incidence high, but the field capable of growing able garden crops. Sample <i>ser</i> exceeded the reported weight by 6 <i>tolas</i> .
0 10	98	15	11½	Experiment No. 94.—Unmanured and unirrigated wheat on poor black soil growing the same crop in each of the past five years. Sowing rain seasonable; but absence of later rains affected the crop. Tillage indifferent. Seed-rate high. Grain valued very high.

Summary of Crop Experiment Reports,

O. S.=Original Survey;

No.	District, Táluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formula.	AVERAGE PER ACRE.					
					Seed.	Yield of		Total Value of Produce.	Assessment excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.
						Principal Product.	By Product.			
1	2	3	4	5	6	7	8	9	10	11
	POONA—continued.		Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.
	<i>Mr. K. B. Deval, District Deputy Collector—contd.</i>									
95	Junnar (Chándoli) ...	Potatoes, 18th March 1898.	9	8,300	818	3,690	...	39 8 6	0 8 2 R. S.	1.29
96	Khed (Pimpalgaon) ...	Onions (red), 17th March 1898.	6 to 7	2,000 to 2,800	16	11,840	...	55 7 6	2 14 8 R. S.	5.25
	SHOLA PUR.									
	<i>Mr. R. P. Bengiri, District Deputy Collector.</i>									
97	Málsiras (Málsiras) ...	Spiked millet (Bá-j-ri), 7th November 1897.	12	640	3½	656	1,320	32 0 0	0 12 10 R. S.	2.50
98	Pandharpur (Shegaon) ...	Gram, 21st February 1898.	12	480	48	895	...	28 8 3	1 3 9 R. S.	4.33
99	Do. (do.) ...	Great millet (Jowári), 21st February 1898.	12	1,120	7	899	1,551 kadbi, 197 chaff.	27 5 4	1 1 4 R. S.	3.96
	SA TA RA.									
	<i>Mr. E. Clements, Assistant Collector.</i>									
100	Válva (Kásegaon) ...	Spiked millet (Bá-j-ri Khurpi), 12th October 1897.	10	500	4	151	345	7 4 5	1 8 2 R. S.	20.75
101	Do. (do.) ...	Do. do., 16th October 1897.	10	500	19½	171	405	8 3 9	3 11 () R. S.	44.78
102	Pátan (Yerád) ...	Rice (Mátar Sal), October 1897.	11	2,880	19	2,515 in husk.	3,200	62 11 4	3 10 10 R. S.	5.86

Central Division, 1897-98—concluded.

R. S.= Revision Survey.

Area of Test	Equivalent in Tolas of local measure Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
		Principal Product.	By Product.	
12	13	14	15	16
A. g.	Tolas.	Lbs.	Cwts.	
0 4	78 (weight)	93	...	<i>Experiment No. 95.</i> —Potatoes grown as a second crop, on a medium black-soil field assessed as dry crop, but which, owing to the recent construction of a well by the occupant, now grows garden crops such as chillies, onions, potatoes, sweet potatoes and carrots. Field manured with 20 carts of cowdung and sweepings after reaping of <i>bājri</i> , the first crop. Water-supply ample, but the crop is said to have suffered owing to late sowing. The crop fetched a very low price owing to the prevalence of plague. Outturn less than half the formulæ standard.
0 4	Do. ...	107	...	<i>Experiment No. 96.</i> —Onions, red, on a good black-soil field irrigated by means of a well, built before settlement. <i>Bājri</i> grown in each of the past four years with <i>rabi jowāri</i> as a second crop last year. Field capable of growing two crops every year but the owner prevented from doing so because of dearness of manure. 20 carts of the ordinary manure applied per acre. Seed-rate high. Crop full 16 annas according to the formulæ. Prices low.
0 10	147	22½	4	<i>Experiment No. 97.</i> — <i>Bājri</i> on a black <i>murmdt</i> soil field which was manured with about 25 carts of household refuse per acre. <i>Jowāri</i> was grown during the previous three years; last year (famine year) it failed totally. Season favourable at first, but a prolonged break in the middle injured the crop to some extent. Late rains effected some improvement. Seed-rate low. Grain valued very high. Sample ser 2½ <i>tolas</i> short of the reported weight.
0 8	144	31½	...	<i>Experiment No. 98.</i> —Unmanured and unirrigated gram on a good black-soil field, which grew during the previous three years (1) <i>jowāri</i> , (2) <i>jowāri</i> and gram, and (3) <i>jowāri</i> . Season at sowing time good, but no rain later on. Tillage good. Outturn very satisfactory and season probably quite favourable.
0 10	137	40½	3 kadbi, 4½ chaff.	<i>Experiment No. 99.</i> — <i>Rabi jowāri</i> on similar soil without any manure. Same crop grown in each of the past three years. Season, &c., as above. Outturn 14 annas of the formulæ. Sample ser 3 <i>tolas</i> in excess of the reported weight.
0 16	108	25	2½	<i>Experiment No. 100.</i> — <i>Bājri</i> on unmanured red soil growing (1) <i>bājri</i> , (2) <i>Dukri jowāri</i> and (3) gram in rotation. Season good. Tillage indifferent. Seed-rate very low. Outturn about 6 annas of the formulæ.
0 8	109	25½	2½	<i>Experiment No. 101.</i> — <i>Bājri</i> on reddish black soil manured with 10 to 12 carts per acre of town sweepings per acre. (1) <i>jowāri</i> , (2) <i>bājri</i> and (3) gram or <i>Khapli</i> wheat grown in rotation. Season, &c., as above. Seed-rate high. Outturn overestimated at 10 annas.
0 4	92	47½	3	<i>Experiment No. 102.</i> —Rice, <i>Mdtār Sāl</i> , on good red soil growing the same crop year after year. Field manured with about 32 carts per acre of the village sweepings. 7 to 8 gunthas of the seed-bed supplied seedlings for an acre of field. Season favourable and tillage careful. Seed-rate low.

Summary of Crop Experiment Reports

O. S.=Original Survey ;

No.	District, Taluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formulae.	AVERAGE PER ACRE.					
					Seed.	Yield of		Total Value of Produce.	Assessment excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.
						Principal Product.	By-Product.			
1	2	3	4	5	6	7	8	9	10	11
BIJA PUR.			Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.
<i>Mr. V. R. Kelkar, District Deputy Collector.</i>										
103	Sindgi (Almel)	Gram (Kadle), 7th February 1898.	5	105	20½	192	245	6 8 6	0 10 9 R. S.	10.36
104	Do. (Sindgi)	Linseed (Agashi), 14th February 1898.	6	100	5	161 seed.	265	7 4 2	0 9 4 R. S.	8.07
105	Do. (do.)	Great millet (Bilejol), 15th February 1898.	6	240	3½	621	1,498 kadbi, 127 chaff.	22 10 6	0 12 3 R. S.	3.38
DHARWAR.										
<i>Mr. R. R. Bhardi and Mr. V. N. Sathaye, District Deputy Collectors.</i>										
106	Gadag (Gadag)	Indigenous cotton (Kumpta), 14th to 31st March 1898.	12	320	7	315 seed cotton.	...	16 0 0	0 12 9 R. S.	4.98
<i>Mr. V. N. Sathaye, District Deputy Collector.</i>										
107	Gadag (Hombal)	Red wheat (Ubbin Godhi), 27th January 1898.	9	500	23½	324	296	14 10 8	1 4 2 R. S.	8.59
108	Do. (Chichkhandigol)...	Gram, 24th February 1898.	6	140	5½	73	8	2 12 5	1 3 4 R. S.	43.52
KOLA BA.										
<i>Mr. G. P. Thakár, District Deputy Collector.</i>										
109	Alibág (Gheráságargad) ...	Eleusine coracana (Halvi Nágli), 21st October 1897.	10	500	6½	704	1,020	20 9 7	0 7 3 R. S.	2.19
RATNA GIRI.										
<i>Mr. A. G. Chuckerbutty, Assistant Collector.</i>										
110	Rájápur (Kodavli)	Paspalum scrobiculatum (Harik), 26th November 1897.	8	280	15	702	1,225	19 15 2	0 3 0 O. S.	0.94

Southern Division, 1897-98.

R. S.—Revision Survey.

Area of Test.	Equivalent in Tolas of local measure Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
		Principal Product.	By-Product.	
12	13	14	15	16
A. g.	Tolas.	Lbs.	Cwts.	
0 8	146 $\frac{3}{4}$	30 $\frac{1}{10}$	14	<i>Experiment No. 103.</i> —Gram on black red <i>kyāsari</i> soil which, owing to failure of rains, was fallowed and not cropped in the previous year. No manure used. Late rains deficient, which reduced outturn. Cultivation good.
0 8	123 $\frac{1}{2}$	22 $\frac{1}{8}$	...	<i>Experiment No. 104.</i> —Linseed on red <i>masdri</i> land under conditions similar to above. The field grew (1) cotton and wheat, (2) white <i>jowāri</i> and (3) kharif <i>jowāri</i> and <i>bājri</i> during three years ending 1895-96. Tillage, &c., as above.
0 8	146 $\frac{1}{4}$	37 $\frac{1}{2}$	2 $\frac{9}{14}$ kadbi, 1 $\frac{3}{4}$ chaff.	<i>Experiment No. 105.</i> —White <i>jowāri</i> grown on good black soil under similar conditions. Kharif and rabi <i>jowāri</i> , cotton and linseed grown in more or less indefinite rotation on the field; <i>bājri</i> and sesamum also occasionally. Tillage good. Season as above; but outturn much better, being 9 annas according to the formulæ.
0 20	20 (weight).	19 $\frac{1}{16}$	...	<i>Experiment No. 106.</i> —Indigenous or Kumpta cotton on black soil which grew wheat and safflower, cotton and <i>jowāri</i> in indefinite rotation during the last three years. The field is never manured. Season favourable; and tillage good. Only two pickings were gathered. Test unreliable for reasons given in the Analysis.
0 20	154	23 $\frac{3}{8}$	2 $\frac{9}{14}$	<i>Experiment No. 107.</i> —Dry-crop red wheat on ordinary black soil. The crops grown in the last two years were (1) last <i>jowāri</i> and gram and (2) cotton. The field last manured in 1894-95. Season favourable; and tillage good. The safflower, which occupied every 7th row, was not tested. The sample <i>ser</i> weighed in this office gave only 147 <i>tolas</i> .
0 20	149	26 $\frac{3}{4}$	1 $\frac{7}{8}$	<i>Experiment No. 108.</i> —Gram mixed with <i>jowāri</i> in equal proportions on similar soil. (1) wheat and safflower, (2) cotton and (3) <i>jowāri</i> and gram grown during the past three years. The field not manured for the last four years. <i>Navani</i> (Italian millet), grown earlier in the season, yielded about an 8-anna crop. Sample <i>ser</i> weighed 5 <i>tolas</i> short of the recorded weight. The experiment unsatisfactory because the gram yielded an unknown proportion of the whole produce. Therefore no useful inference can be drawn from the high percentage of incidence.
0 10	71 $\frac{1}{2}$	40	3	<i>Experiment No. 109.</i> — <i>Halvi nāgli</i> on good <i>varkas</i> level land, which grows <i>nāgli</i> and <i>vāri</i> after two or three years of fallow. The seed-bed manured with cowdung and <i>rūbed</i> . About 8 <i>gunthas</i> of seed-bed sufficed for an acre of plantation. Season very favourable except that continuous rain at flowering stage did some damage. Tillage very careful. Incidence low. Outturn 14 annas according to the formulæ.
0 8	29 $\frac{3}{4}$	36 $\frac{3}{8}$	14	<i>Experiment No. 110.</i> — <i>Harik</i> on gravelly sloping <i>bharād varkas</i> land of the ordinary kind which grows three crops of <i>nāgli</i> , <i>harik</i> and <i>tīl</i> after eight or nine years' fallow. Season favourable. Tillage indifferent. Outturn 14 annas of the formulæ.

Summary of Crop Experiment Reports,

O. S.=Original Survey ;

No.	District, Taluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formula.	AVERAGE PER ACRE.					
					Seed.	Yield of		Total Value of Produce.	Assessment excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.
						Principal Product.	By-Product.			
1	2	3	4	5	6	7	8	9	10	11
	RATNAGIRI—continued.		Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.
	<i>Mr. L. O. Swift, Assistant Collector.</i>									
111	Chiplún (Sávarde) ...	Paspalum scrobiculatum (Harik), 11th November 1897.	16	1,000	41	466	32 bundles.	10 0 0	0 3 10 O. S.	2.39
112	Khed (Lavel) ...	Eleusine coracana (Náchni), 18th November 1897.	12	1,600	13	766	24 bundles straw, 8 baskets chaff.	24 15 4	0 5 5 O. S.	1.35
	<i>Mr. V. D. Yennemadi, District Deputy Collector.</i>									
113	Ratnágiri (Khedshi) ...	Paspalum scrobiculatum (Harik), 4th November 1897.	12	640	31	741	...	14 0 2	0 2 5 O. S.	1.07
114	Do. (do.) ...	Nigerseed (Kárale), 5th November 1897.	12	400	11½	94 seed.	...	4 9 4	0 2 4 O. S.	3.18
115	Do. (Khánū) ...	Eleusine coracana (Nágli), 8th November 1897.	12	1,280	12	903	1,041	36 15 3	0 5 0 O. S.	0.84
116	Do. (Páli) ...	Do. do. 9th November 1897.	10	1,000	13½	609	628	24 9 9	0 4 4 O. S.	1.10
	KANARA.									
	<i>Mr. L. G. Deshmukh, Assistant Collector.</i>									
117	Kárwár (Shirvád) ...	Rice (Bile Pandia), 19th October 1897.	14	1,350	103	2,368 in husk.	3,760	96 2 0	5 5 4 O. S.	5.55
118	Kumta (A'lkad) ...	Sugarcane (Daskab-bu), 18th January 1898.	13	5,100	10,000 seed tops.	2,550 Gul.	7,370 seed tops and green leaves.	218 13 10	0 6 5 O. S.	0.15
	<i>Mr. J. F. Keatinge, Assistant Collector.</i>									
119	Kárwár (Bád) ...	Rice (Belpandia), 8th October 1897.	12	1,200	118	2,939 in husk.	3,666	119 14 5	4 10 3 O. S.	3.87
120	Haliyál (Haliyál)...	Do. (Yeli sali), 4th November 1897.	10	1,240	118	2,591 do.	5,437	89 12 8	3 13 0 O. S.	4.24
121	Yellápur (Bálgor) ...	Do. (Vaingan), 20th May 1898.	10	...	133	1,752 do.	1,992	38 15 11	3 6 0 O. S.	8.7
	<i>Mr. V. N. Sathaye, District Deputy Collector.</i>									
122	Honávar (Aroli) ...	Do. (Jeddi kempi), 20th April 1898.	16	...	166	1,606 do.	2,510	43 10 8	5 11 5 O. S.	13.03

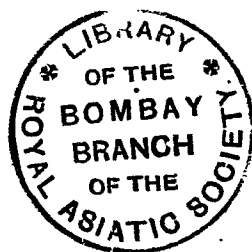
Southern Division, 1897-98—concluded.

R. S.=Revision Survey.

Area of Test.	Equivalent in Tolas of local measure Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
		Principal Product.	By-Product.	
12	13	14	15	16
A. g.	Tolas.	Lbs.	Cwts.	
0 2)	46½	49	64 bundles.	Experiment No. 111.—Harik on fairly level <i>bharad varkas</i> land growing (1) <i>ndgli</i> , (2) <i>harik</i> , (3) <i>vari</i> and (4) <i>til</i> (nigerseed) after five years of fallow. No manure was applied. The season was favourable; and tillage good. The crop was reported as the best obtained during the past 20 years. Seed-rate very high. The outturn only 9 annas of the formulæ.
0 5	53½	32½	16 bundles straw, 64 bashes, chaff.	Experiment No. 112.— <i>Ndgli</i> , third crop in the rotation, on <i>bharad varkas</i> land growing (1) <i>ndgli</i> , (2) <i>harik</i> , (3) <i>ndgli</i> , (4) <i>harik</i> and (5) <i>til</i> (nigerseed) after four years' rest. The field was <i>rabed</i> as usual with 50 head-loads of cowdung, 60 of tree loppings, 50 of grass and 12 of <i>harik</i> straw per acre. The seed was sown in a seed-bed and seedlings transplanted in the field; but the proportionate area of the seed-bed has not been given. Season was favourable and tillage good, except that the cultivator did not give the ordinary application of fish manure. Sample <i>ser</i> 2 <i>tolas</i> short of the recorded weight. Yield 8 annas of the formulæ.
0 8	43	53	...	Experiment No. 113.—Harik on a well situated and somewhat level land growing (1) <i>ndgli</i> , (2) <i>harik</i> , (3) <i>vari</i> , (4) nigerseed and (5) <i>Sarvat</i> rice after seven years of rest. No manure used. Season favourable; and tillage good. Seed-rate high.
0 8	44½	20½	...	Experiment No. 114.— <i>Karle til</i> (nigerseed), fourth crop in the rotation, on similar land cropped for five years after six years' rest. Season as above. Outturn only 6 annas of the formulæ. Seed-rate high.
0 8	52½	25½	6	Experiment No. 115.— <i>Ndgli</i> on somewhat superior <i>varkas</i> land growing the usual crops for five years after five years' rest. Seeds first sown in a seed-bed, <i>rabed</i> with cowdung, grass, dry leaves, &c. Ten gunthas of seed-bed sufficed to raise seedlings for an acre of plantation. Cultivation good; and season favourable. The outturn represents a 10 anna crop of the formulæ.
0 8	52½	25½	6	Experiment No. 116.—Same crop on similar land cropped for four years after being rested for three years. Other conditions as above. Yield somewhat lower than in the above test attributed to less careful cultivation.
0 4	57	26	6½	Experiment No. 117.—Monsoon rice on a sandy or <i>revachi</i> soil field growing the same crop continuously. The field manured with about 300 head-loads of cattledung, sweepings and dry forest leaves per acre. Season favourable; and tillage good. Yield nearly double of the formulæ for broadcast sowing. Price of grain very high. Sample <i>ser</i> 3 <i>tolas</i> short of the recorded weight.
0 4	23½	16	1½	Experiment No. 118.—Sugarcane on yellowish clayey soil mixed with small stones, classed as <i>jirdyat</i> at the original survey, but made suitable for growing <i>budyat</i> crops by the occupant at considerable expense. Grass and dry leaves burnt before planting and 50 carts of cowdung per acre applied four months after planting. The land grew the same crop in the previous year and was waste for two years before that. Season favourable; and tillage good. The crop watered during the first four months of its growth from a channel drawn from a stream about a furlong distant from the field. Outturn rather poor. About 19,000 seed tops were reserved for replanting and have been valued at Rs. 50; green leaves fed to cattle at Rs. 10.
0 4	61½	26½	4½	Experiment No. 119.—Early rice, sown broadcast, on <i>kaingadde</i> sandy dark-brown soil growing the same crop every year. Field manured with compost of cowdung and dry leaves at about 50 baskets per acre. Season on the whole good; and tillage good. Seed-rate rather high. Outturn represents full crop for planted rice and quite double of that for broadcast sown crop of the formulæ. Sample <i>ser</i> weighed 2 <i>tolas</i> short of reported weight. Price of grain very high.
0 4	77	29½	21½	Experiment No. 120.—Same crop, drilled, on land with a slight natural slope but terraced for growing rice. Sugarcane used to be grown on part of the field but given up for want of manual labour and also perhaps for want of water. Field manured with 4 carts of compost of cowdung, town refuse and grass. September rain scant and crop irrigated once in that month from an adjoining tank, the water of which, however, was insufficient to grow a second crop. Outturn good. Prices higher than usual.
0 4	81	47½	8½	Experiment No. 121.—Hot weather or <i>Vaingan</i> rice on land situate in the midst of spice gardens and heavy forest. The field grows both early and late rice and also sugarcane in part of the field. About 200 baskets of compost of manure applied per acre. Field irrigated by means of a stream flowing from a spring in a private field for which no charge is levied. Water scant at end of hot season, but crop helped by rain at this time. Season favourable; and tillage fair.
0 4	162	41½	4½	Experiment No. 122.—Same crop on soft brown sandy soil growing the same crop year after year and probably a rain crop also. Land manured with about 115 head-loads of compost of the usual manure per acre. Crop watered from a channel flowing from a dam a mile off the field. Season favourable; and tillage good.

CROP EXPERIMENTS,
BOMBAY PRESIDENCY,
1898-99.

I-8



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From

W. P. SYMONDS, ESQUIRE, I. C. S.,
Survey Commissioner and Director,
Land Records and Agriculture ;

To

J. W. P. MUIR-MACKENZIE, ESQUIRE, I. C. S., M.R.A.C.,
Chief Secretary to Government, Revenue Department,
Bombay.

Poona, 4th February 1901.

SIR,

I have the honour to submit, herewith, the usual Analysis of Crop Experiments carried out in 1898-99 prepared by Mr. J. Mollison, Deputy Director of Agriculture. The delay in the submission of the report is due to Mr. Mollison's being engaged on special famine duty in Gujarát.

2. The table below exhibits the extent of work done.

Division.	1897-98.		1898-99.	
	Reported.	Rejected.	Reported.	Rejected.
Northern Division ...	66	...	37	10
Central do. ...	41	5	45	10
Southern do. ..	20	...	16	2
Total ...	127	5	98	22

3. The large number of experiments shown against the Northern Division during 1897-98 is due to the inclusion of 31 experiments specially undertaken in the Broach district under the orders of Government for gauging the incidence of the current assessment with a view to determine the extent and nature of future revisions. Recently the work of crop experiments has been considerably hampered owing to plague and famine, and no experiments were carried out in three districts of the Southern Division. Elsewhere some of the officers were unable to attend to this work owing to the same cause.

4. Only 4 experiments were conducted by the Superintendent, Land Records and Agriculture, C.D., all the others being done by the officers of the Revenue Department. The Superintendent, Land Records and Agriculture, S.D., could not experiment as he was placed on plague duty in Belgaum. The Survey Officers were busy in finishing their operations and had very little time for experiments. Mr. Mollison, Deputy Director of Agriculture, was also otherwise engaged.

5. Three experiments on ginger, sugarcane and plantains (Nos. 25 to 27 in the Tabular Statement) submitted by Mr. Patvardhan (Thána) were in connection with a special experiment which he was directed to perform on a two-acre holding in the Máhim taluka. He has, however, omitted to furnish details of cost of cultivation and other information necessary for a special experiment, and so his tests have been treated as "ordinary". The Collector should not have asked a junior officer of Mr. Patvardhan's standing to carry out a special experiment as the work requires considerable tact and experience and only experienced officers who take a good deal of interest in agriculture can be expected to do it successfully. All the other experiments received are "ordinary."

6. The following table exhibits the distribution of tests over the several crops selected for experiment, the crops which are intended to find entry in the quinquennial return required by the Secretary of State for India being marked with an asterisk ; —

Division.	* Jowári.	* Bájri	* Rice	* Wheat.	* Kodra.	* Nágil.	* Gram.	Val.	Plantains.	Ginger.	* Sugarcane.	* Sesamum.	* Linseed.	* Groundnut.	* Cotton.	Total.
Northern Division ...	4	1	8	3	2	...	2	1	1	1	2	2	...	...	...	27
Central do. ...	2	1	9	8	...	5	3	...	...	...	2	...	1	3	1	35
Southern do. ...	2	...	2	2	2	2	...	...	...	...	1	1	2	...	...	14
Total ...	8	2	19	13	4	7	5	1	1	1	5	3	3	3	1	76

7. As desired in paragraph 3 of Government Resolution No. 8075, dated 13th November 1899, Revenue Department, a statement comparing the number of experiments asked for on each crop in every district with the number actually carried out, with explanations received for not following the programme, is hereto appended.

8. Mr. Mollison proposed to include in the Tabular Statement certain experiments on mixed crops (taken before the issue of Government Resolution No. 4318, dated 7th July 1900, R. D.) and certain other experiments which gave misleading outturns. I have thought it best to exclude these as the results cumber the record without giving useful information, and readers are apt to draw conclusions from the figures without attending to the explanations in the column of remarks.

9. Mr. Mollison does not think that the standard of work on the whole is as good as that of some former years. There is evidence of considerable want of discrimination in the selection of fields for experiment, and crops which were not nearly average for the fields or the season were tested. Other shortcomings are referred to in detail in the body of the report.

10. Mr. Mollison also desires to draw special attention to his remarks on the experiments taken in the Anklesvar taluka of Broach and in the Olpad and Balsar talukas of Surat.

11. He remarks that in the Northern Division careful experiments were conducted by Mr. Mead, Mr. Emanuel, Mr. Sorábsháh Hormasji, Mr. S. S. Kádri and Mr. Shepherd. In the Central Division Messrs. Plunkett, Anderson and Sale deserve commendation for reliable work." Mr. Sale was unfortunate in selecting a diseased linseed crop but he appreciated the fact that there was something wrong with the outturn result. In the Southern Division the most satisfactory experiments have been conducted by Messrs. Cama, Kelkar and Joshi.

I have the honour to be,

Sir,

Your most obedient Servant,

W. P. SYMONDS,

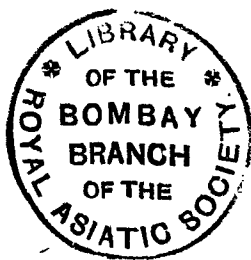
Survey Commissioner and Director,
Land Records and Agriculture.

Statement showing the Working of the Programme of Crop Experiments during 1898-99.

District.	Experimenter.	Experiments directed to be undertaken.	Experiments actually carried out.	Explanation, if any, for not following the Programme.
NORTHERN DIVISION.				
Ahmadabad ...	Assistant Collector in charge Daskroi Sub-Division.	Three tests on one or other of the following crops :— wheat, <i>jowár</i> , <i>bājri</i> , gram.	One test each on <i>jowár</i> , wheat and gram by Mr. Mead.	Programme worked out.
	District Deputy Collector in charge Sānand Sub-Division.	Do. do. <i>jowár</i> , rice, <i>bājri</i> and gram.	One test on gram by Mr. Emanuel.	Mr. Emanuel was in charge of the Huzúr Treasury till 9th January, so he could not take tests in other crops.
	District Deputy Collector in charge Viramgām Sub-Division.	Do. do. <i>jowár</i> , rice, wheat and gram.	Two tests on wheat and one on gram by Mr. Náná-vati.	Programme worked out.
Kaira ...	Assistant Collector ...	Two tests on <i>bājri</i> and one or more on <i>kodra</i> , <i>rāgi</i> and gram.	Two tests on <i>bājri</i> and one on rice by Mr. De Souza.	Mr. Beyts, who took over charge from Mr. De Souza, intended to do a test on gram, but was prevented by his transfer.
	District Deputy Collector.	Do. do. ...	Two tests on gram by Mr. Modi.	No explanation received.
Panch Mahāls .	Assistant Collector...	Two tests on <i>kodra</i> , one on <i>bājri</i> and one on <i>rāgi</i> .	One test on <i>bājri</i> by Mr. Rendall.	Mr. Rendall being unable to find suitable fields of <i>kodra</i> and <i>rāgi</i> , was asked to take two tests on gram and two on wheat. Later on however he was engaged on plague duty and was exempted from the work.
	District Deputy Collector.	One test on rice and one on <i>kodra</i> and two on sesamum.	One test each on rice, <i>kodra</i> and sesamum by Mr. Bharucha.	Mr. Bharucha omitted to do the other sesamum test, having misunderstood the orders issued.
Broach ...	Assistant Collector ...	Ordinary experiments on <i>bājri</i> , <i>láng</i> , and cotton, and a special one on <i>jowár</i> and cotton.	One test on <i>jowár</i> by Mr. Painter.	Increased pressure of work on account of plague, and <i>bājri</i> and <i>láng</i> crops not being available near Mr. Painter's camp, he could not test them. He also reported difficulties in carrying out the cotton test in which pickings have to be tested for several weeks.
	District Deputy Collector.	Ordinary experiments on rice, <i>jowár</i> and sesamum.	One test each on rice and sesamum by Mr. Sorábsháh.	Mr. Sorábsháh omitted to test <i>jowár</i> , as he was on plague duty when the crop ripened.
Surat ...	Assistant Collector in charge Chorási Sub-Division.	Three experiments on any of the following crops (the first three to be preferred) :— <i>jowár</i> , <i>bājri</i> , wheat, sugarcane and rice.	One test each on rice and <i>bājri</i> by Mr. Vernon, and one on <i>jowár</i> by Messrs. Wales and Vernon.	Mr. Vernon had commenced the last test (<i>jowár</i>) when he gave over charge to Mr. Wales, who supervised the threshing and weighing of the crop.
	District Deputy Collector in charge Olpád Sub-Division.	Do. do. <i>jowár</i> , cotton, rice and gram.	Three tests on <i>jowár</i> by Mr. Kádri.	Programme followed.
	District Deputy Collector in charge Balsár Sub-Division.	Do. do. <i>rāgi</i> , <i>kodra</i> , rice and sugarcane.	Three tests on rice, one on <i>vál</i> (a second crop after rice) and one on <i>kodra</i> by Mr. Master.	Do.
Thána ...	Assistant Collector in charge Bassein Sub-Division.	Tests on sweet rice and sugarcane.	One test each on sweet rice and sugarcane by Mr. Shepherd.	Do.
	Assistant Collector in charge Kalyán Sub-Division.	One test on gram and one on sweet rice in Sháhápúr taluka.	One test on rice by Mr. Monteath.	Owing to plague work Mr. Monteath could not do more than one test.
	District Deputy Collector in charge Bhivndi Sub-Division.	Ordinary experiments on <i>rāgi</i> and gram, and a special one on a two-acre holding in the garden lands in Máhm taluka.	One test each on rice, ginger, plantains and sugarcane by Mr. Patvardhan.	Mr. Patvardhan could not do the <i>rāgi</i> test as at the time he was engaged in examining Jamábandi accounts and was on plague duty when the gram crop ripened.
CENTRAL DIVISION.				
Khándesh ...	Each of the five Sub-Divisional Officers.	Two tests on rice, one on sesamum and one on gram.	No tests carried out ...	Plague work and absence of a suitable crop near his camp prevented Mr. Hatch from doing the rice tests. Mr. Keatings, who took over charge from him, intended to do a test on gram, but found it all cut.
		Do. do. ...	Two tests on rice and one on gram by Mr. Varley.	The sesamum was all reaped before Mr. Varley returned from leave, and so he could not test it.

District.	Experimenter.	Experiments directed to be undertaken.	Experiments actually carried out.	Explanation, if any, for not following the Programme.
CENTRAL DIVISION—continued.				
Khândesh—contd	Each of the five Sub-Divisional Officers—contd.	Two tests on rice, one on sesamum and one on gram.	One test each on rice, gram and sesamum by Mr. Shálom Bápuji.	Mr. Shálom Bápuji intended to do one more test on <i>gorád</i> rice raised in beds of <i>nálas</i> in Taloda and reaped in April but was prevented by his transfer.
		Do. do. ...	Two tests on rice and one on gram by Mr. Joshi.	Sesamum was all cut before Mr. Joshi left the head-quarters; he could not start earlier as he had charge of two sub-divisions.
		Do. do. ...	No experiments carried out.	Mr. Sitáram Dámodar made no experiments at all. Sesamum was all cut before the orders reached him, rice was only sparingly grown in his charge, and at the time the gram crops were ready for harvest he had to be present in Dhulia for announcing revision survey rates.
Násik ...	Assistant Collector in charge Málegaon Sub-Division.	One test each on cotton, groundnut and linseed.	One test on cotton and one on linseed by Mr. Simcox.	Mr. Simcox could not test groundnut as at the time he was engaged on political duty.
	Assistant Collector in charge Yeola Sub-Division.	One test each on <i>jowári</i> , cotton and sugarcane.	One test on sugarcane by Mr. Motilál.	No explanation received.
	District Deputy Collector.	Two experiments on <i>rági</i> and one on wheat.	Two tests on <i>rági</i> and one on wheat by Mr. Plunkett.	Programme followed.
Ahmednagar ...	1st Assistant Collector.	Two tests on <i>báji</i> and one on <i>jowári</i> .	One test on rice, two on wheat and one on gram by Mr. Anderson.	Being on special duty in Akola at the time the prescribed crops were reaped, Mr. Anderson selected for his tests other crops instead of allowing the season to pass away.
	2nd Assistant Collector.	One test on <i>báji</i> and two on <i>jowári</i> .	Two tests on <i>jowári</i> by Mr. Wilkinson.	No explanation received.
	District Deputy Collector.	One test each on <i>jowári</i> , <i>báji</i> and wheat.	One test each on <i>jowári</i> , wheat and gram by Mr. Fendse.	Do. do.
Poona ...	Assistant Collector in charge Eastern Sub-Division.	One test on <i>báji</i> in Purandhar, sesamum in Sirur, and linseed in Indapur.	One test each on <i>báji</i> , linseed and wheat by Mr. Sale.	Mr. Sale was unable to find a suitable sesamum crop, and so selected wheat instead.
	Assistant Collector in charge Western Sub-Division.	One test on rice in Mával, one on groundnut in Khed, and one on wheat in Junnar.	One test each on rice, groundnut and wheat by Mr. Crofton.	The wheat in Junnar was all cut before Mr. Crofton could arrange to get there, and so he selected the same crop in Mával.
	Assistant Collector ...	Three or more tests on rice, <i>báji</i> , linseed, sesamum and groundnut.	No experiments received...	Mr. Chuckerbutty carried out a test on rice and another on groundnut, but owing to pressure of plague and other work he could not gather the additional information required, and so has not submitted the results.
Sholápur ...	District Deputy Collector.	Do. do. <i>báji</i> , linseed, sesamum, groundnut, sugarcane and cotton.	One test each on groundnut, sugarcane and linseed by Mr. Bengiri.	Programme followed.
	1st Assistant Collector.	Two tests on rice and one on <i>rági</i> .	One test on <i>rági</i> , two on rice and one on wheat by Mr. Percival.	Do.
Sátára...	2nd Assistant Collector.	One test each on <i>rági</i> , <i>báji</i> and rice.	One test on rice, one on <i>báji</i> and two on <i>rági</i> by Mr. Palmer.	Do.
	District Deputy Collector.	Two tests on linseed and one on <i>báji</i> .	No experiments carried out.	Mr. Heblíkar was engaged on audit duty when <i>báji</i> was being reaped, and later on he could not find a suitable linseed field.
SOUTHERN DIVISION.				
Belgaum ...	.....	.....	.....	The Collector reported at the outset that on account of heavy plague work it would not be possible for any of his Assistants to conduct experiments during the year.
Bijápur ...	Assistant Collector in charge Bijápur Sub-Division.	One test on kharif or rabi <i>jowári</i> , one on gram, and one on wheat, gram, linseed or cotton.	No experiments carried out.	No explanation received.

District.	Experimenter.	Experiments directed to be undertaken.	Experiments actually carried out.	Explanation, if any, for not following the Programme.
SOUTHERN DIVISION—continued.				
Bijapur—contd.	Assistant Collector in charge Bagevadi Sub-Division.	One test on kharif or rabi <i>jowari</i> , one on gram and one on wheat, cotton or linseed.	One test each on linseed, <i>jowari</i> and wheat by Mr. Cama.	Mr. Cama could not do kharif <i>jowari</i> and gram tests owing to exigencies of other work. The Collector considered the explanation unsatisfactory.
	District Deputy Collector in charge Bagalkot Sub-Division.	One test on kharif or rabi <i>jowari</i> , one on <i>bajri</i> , and one on wheat, cotton or linseed.	One test each on <i>jowari</i> , linseed and wheat by Mr. Kelkar.	Mr. Kelkar omitted to test kharif <i>jowari</i> and <i>bajri</i> owing to his being on plague duty and later on partly to his illness. The Collector considered the explanation not valid.
Dharwar ...	1st Assistant Collector.	One test each on <i>ragi</i> , sesamum, sugarcane and cotton.	No experiments received.	None of the officers were able to carry out experiments owing to pressure of plague work.
	2nd Assistant Collector.	One test each on rice, sesamum, gram and cotton.		
	District Deputy Collector.	One test each on wheat, <i>jowari</i> , sesamum and linseed.		
Kolaba ...	Assistant Collector ...	Two tests on <i>ragi</i> or <i>vari</i> and one on gram or sesamum.	No experiments received.	Mr. Thakur held charge of both the sub-divisions from the commencement of the season till the middle of February and owing to stress of plague and other work, no experiments were undertaken.
	District Deputy Collector.	Do. do.		
Ratnagiri ...	Assistant Collector in charge Northern Sub-Division.	One test on <i>kodra</i> , one on <i>ragi</i> and two on sesamum.	One test each on <i>ragi</i> and <i>kodra</i> by Mr. Madgaonkar.	Sesamum was all cut before Mr. Madgaonkar started. He intended to do two tests in Khed, but the crops there were reaped earlier than usual owing to anticipated damage by locusts.
	Assistant Collector in charge Central Sub-Division.	Do. do.	Two tests on sesamum, two on <i>kodra</i> , and one on <i>ragi</i> by Mr. Deval.	Both the charges were held by one officer and Mr. Deval was asked to do tests in one charge only.
	Officer in charge Southern Sub-Division.	Do. do.		
Kanara ...	Assistant Collector in charge Kharwar Sub-Division.	Three experiments on rice, sugarcane or <i>ragi</i> as convenient.	One test on rice by Mr. Baker.	Mr. Baker was in charge of the Treasury for some time and later on, on plague duty, so he could not carry out any more experiments.
	District Deputy Collector in charge Sirsi Sub-Division.	Do. do.	One experiment on rice by Mr. Yennemadi and one on sugarcane by Mr. Joshi.	Mr. Joshi intended to take a test on late rice, but was prevented from exigencies of the season and pressure of other work.



ANALYSIS OF CROP EXPERIMENTS.

NORTHERN DIVISION.

Ahmadabad.

Experiments on *jowár*, *bájrí*, rice, wheat and gram were arranged for in this district. Mr. Mead did one experiment each on *jowár*, wheat and gram; Mr. Nánávati did two on wheat and one on gram. Mr. Emanuel carried out only one experiment on gram. It is explained that he was in charge of the Huzúr Treasury till the middle of January and so could not take tests in *jowár*, *bájrí* or rice.

Mr. P. J. Mead, Assistant Collector,

Reports three tests, one each on *jowár*, wheat and gram.

Utávali or early ripening variety (Exp. No. 1) of *jowár* was grown on *gorádu* (sandy loam) soil, which bears an assessment of Rs. 3-14-3 per acre. The reported rotation shows that ordinarily *bájrí* and subordinate pulses are grown. For the sake of change in the rotation *jowár* is occasionally taken; also because its fodder is valuable. The experimenter gives *Utávali* as the name of the variety. The high seed-rate, 89 lbs. per acre, the short period between seed time and harvest, and the number of bundles of fodder per acre all indicate that the variety grown was *Sundhia*. This is an excellent fodder variety which is extensively cultivated throughout the sandy soils of northern Gujarát. The value of the fodder exceeded the value of grain per acre. This is usually the case with *Sundhia*. The field was well cultivated, being liberally manured and repeatedly ploughed. The seed was broadcasted in August. The crop ripened in October and yielded 714 lbs. grain and 850 bundles *kadbi* per acre. The 16-anna estimate is perhaps high but, if the crop was actually *Sundhia*, the outturn of grain was at least full average, and the *kadbi* would, later in the season, be worth a good deal more than the estimated value at the date of experiment. The incidence of assessment works out 12·09 per cent. This is not unduly high.

The wheat test (No. 2) was taken on *gorádu* soil, which is irrigable from a well to some extent. The whole number is 5 acres 20 gunthas in extent, but apparently only a small portion, probably 20 gunthas only, was irrigated in each of the last two years. The assessment is only Re. 1-13-1 per acre. *Bájrí* with subordinate crops and, occasionally, maize is grown in the kharif season, and is followed on a part of the number by wheat or maize, or sometimes both, in the rabi season. The area irrigated is close to the well. The tested crop was unmanured, but the previous crop of *bájrí* got a dressing of 20 carts of cowdung manure per acre. The season was fair and tillage good. The seed was drilled in November at the rate of 123 lbs. per acre. The crop was reaped in the third week of February and gave 1,290 lbs. grain worth Rs. 49-1-11 per acre at 26½ lbs. per rupee. The by-product was neither weighed nor valued. The incidence comes to 3·70 per cent. The experimenter observes: "The wheat was a fair average crop for the big villages of Modása; lands close to village sites are well manured and watered. In this case the land was near one of the many hamlets which cluster round the principal village sites in Modása. The ear of corn here is not so heavy as round Dhansara or in Daskroi."

This officer's third test (No. 3) was on gram, which was a second crop grown in rice land. The soil is *besar* (clay loam). It bears an assessment of Rs. 8-4-1 per acre and the occupant also pays Rs. 7 per acre to the Irrigation Department for the rice crop. The field, in favourable seasons, grows rice followed by gram. Twenty carts of village manure per acre were applied to the first crop. Season and tillage were good. The part experimented upon was a fair sample of the whole field, which was all sown with gram. Seed was drilled at the rate of 52 lbs. per acre. The outturn came to 905 lbs. pulse per acre, worth Rs. 24-13-1. The incidence, 33·27 per cent., is on the second crop only.

Mr. A. E. L. Emanuel, Assistant Collector,

Submits one test on gram. The experiment (No. 4) was made on ordinary dry-crop black soil, assessed at Re. 1-14-11 per acre. The field lies in a

flat plain, and, according to local opinion, did not differ materially in fertility or otherwise from the surrounding lands. The occupants are two well-to-do Kunbis, who, in the opinion of the experimenter, employ the best system of cultivation usual in the district. Wheat was grown in the field in the three preceding years; and cattle manure, about $7\frac{3}{4}$ loads per acre, was last applied in June 1897. The field, as usual for rabi crops in Gujarát, got a good deal of preparatory tillage. It was ploughed 8 times with the light *hal* (plough) during the monsoon and later. The seed was drilled in the middle of October and the crop was ready in the beginning of February. The reported seed-rate, 32 lbs. per acre, is somewhat under average. The season is described as fair and rainfall insufficient. The outturn, 916 lbs. of pulse and 614 lbs. of chaff, &c., per acre, is, I think, underestimated at 12 annas or the average standard. The experimenter reports that the test area, 8 gunthas, was measured off in the middle of the field. It is clear from the experimenter's remarks that the crop was close and even on at least the test area and presumably over the whole field. I have never yet seen in Gujarát a dry crop in a rabi field which did not show some degree of patchiness somewhere and more particularly on the headlands or boundaries, and it is difficult for an experimenter to give due weight to these vacancies in selecting a test area. The incidence of assessment works out to 7·28 per cent.

Mr. D. N. Nánávati, District Deputy Collector,

Submits three experiments, one on gram and two on wheat. The descriptive notes are meagre.

I cannot accept the outturn figures of the gram test as accurate and the experiment is omitted from the tabulated statement. The yield of pulse comes to 1,813 lbs. per acre. This represents a crop such as a good cultivator might expect from a highly farmed garden land and assisted by irrigation. The field is large, $18\frac{1}{4}$ acres in extent. It is ordinary black dry-crop rabi land which grows wheat and gram alternately. The experimenter makes the remark that "the field is not manured at all." The assessment is Rs. 2-5-8 per acre and the gross value of the outturn from Mr. Nánávati's test area comes to Rs. 66-8-8 per acre, an extraordinary result for a 12-anna crop even in the fertile plains of Gujarát.

The second test (No. 5) on wheat was taken also on a dry-crop black soil field, which grows wheat, *tal* (sesamum) and *jowár* in rotation, and bears an assessment of Rs. 2-7 per acre. The field of the third experiment (No. 6), also on wheat, is called "*jiráyat* stony soil." It bears a lower assessment of Re. 1-11-2 per acre and grows usually *bájri* with second crops of wheat and *jowár* but probably only in such portions as are commanded by a well owned by the occupant. The wheat tested was irrigated 12 times. It was also manured at the rate of 12 cart-loads of ordinary manure per acre. The season was favourable at the dry crop. The irrigated wheat was slightly rusted. The respective seed-rates were 51 and 65 lbs. per acre. The variety grown was in each case *Potalia*, apparently the same as *Khapli* or spelt wheat of the Deccan. The experimenter reports the by-product as useless for fodder. The straw, &c., of spelt wheat is certainly inferior as compared with that from other varieties but as fodder it has some value.

The outturn results were as under :—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Incidence of Assessment.
		Principal Product.	By-product.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.
First field (Exp. No. 5) ...	11	903	250	38 15 0	2 7 0	7·18
Second field (Exp. No. 6) ...	11	751	120	27 15 . 2	1 11 2	6·07

Kaira.

Experimenters were asked to take two tests on *bájri* and one or more on *kodra*, *rági* or gram. Mr. DeSouza conducted two experiments on *bájri* and one on rice. Mr. Beyts, who, later on, took over charge from Mr. DeSouza,

intended to do an experiment on gram, but was prevented from doing so owing to his transfer: Mr. Modi carried out two tests on gram. His omission to do the *bájri* experiments has not been explained.

Mr. F. X. DeSouza, Assistant Collector,

Submits three tests, one on rice and two on *bájri*.

The first experiment (No. 7) was made on *Sutarsál* transplanted rice grown on *kiari* or embanked rice land assessed at Rs. 8-3-10 per acre and irrigated from a tank. During a break in the rains in September the cultivator has a well for irrigation. The field invariably grows rice, and a second crop of wheat has also been grown in every year except one since 1894. Night-soil manure, 11 carts per acre, was applied before the rains. The field was three times ploughed, once harrowed and once levelled with *samár*, a plank roller, before the seedlings were transplanted. Approximately $3\frac{1}{4}$ gunthas of seed-bed sown with 56 lbs. of seed gave sufficient seedlings for an acre of transplantation. The seed-bed was manured with night-soil manure at the rate of some 26 cart-loads per acre. The field is rented by the cultivator from the registered owner. The tenant finds seed and labour; the owner gives manure and pays the assessment and takes half the produce. The crop, which is estimated at the maximum standard, gave a good outturn of grain, 2,282 lbs. per acre. The grain is valued low and the straw high. The gross value comes to Rs. 59-6 per acre. Allowing a fair value for the manure the superior holder probably made a clear profit of $1\frac{1}{2}$ times or perhaps twice the assessment. Presumably the tenant knows his business and has made a living. The incidence on assessment works out 13·89 per cent., which may be considered a moderate or reasonable figure.

The two *bájri* fields (experiments not included) are ordinary dry-crop lands. The soil of the first field is locally called *Jesni*, the meaning of which term I do not understand; the second is called *besar*, which signifies a clay loam. The first field was fallow in 1896-97, the second was waste in the same year and also in the year 1894-95. It is commanded by a well and grew wheat after *bájri* in 1897-98, and there are probably good reasons, which the experimenter did not investigate, why the field lay waste in two years out of four.

The *bájri* in the fields of experiment was only one crop of a mixture as usual in this district. The experimenter explains that the subordinate crops were inconsiderable. This to some extent may be a conjecture. *Tuver* in the Kaira district, after other crops are removed, grows and branches out in an amazing manner, and ordinarily the subordinate crops are more valuable than the *bájri*, which in some seasons is by no means the *principal* crop. In the first field there were 6 subordinate crops, *tuver*, *math*, *mag*, *chola*, *guvár* and *rátadia* or red *jowar*. In the second field *jowár* alone was sown subordinate to the *bájri*. The accuracy of this may be questioned because such a mixture even on *besar* land, which suits *jowár* better than *bájri*, is very uncommon. The crop in the second field is reported to have been irrigated from a well, but the extent of irrigation is not reported. Both fields were sown early in August, a late or unseasonable date. They ripened respectively on the 16th and 23rd of October and therefore the character of the season forced the crops prematurely to maturity. The experimenter's notes show that each field was carefully tilled before sowing and also subsequently and manured with fair liberality; but the cultivation in the first field is described as indifferent, in the second as good. It is therefore not easy to weigh the evidence.

The outturn results were as under:—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Incidence of Assessment.
		Principal Product.	By-product.			
		As.	Lbs.	Bundles.	Rs. a. p.	Per cent.
First field	12	333	560	17 13 9	4 9 10	25·80
Second field	10	405	640	23 12 0	5 9 7	23·57

If we take into consideration the whole circumstances disclosed by the above figures and in the experimenter's report we must conclude that the reported value of outturn has no bearing on the burden of assessment; therefore for practical purposes the experiments are useless.

Mr. B. E. Modi, District Deputy Collector,

Submits two tests on gram which are not included in the tabulated statement. He should, I think, have selected his fields with more discrimination. His report is sketchy; but the few notes given show that the crop in the first field was seriously damaged by white ants and in respect of both fields the experimenter says "they suffer from water under which they are submerged during the rains. Rice cannot be sown generally." Each number is assessed as rice land, and, if Mr. Modi's statement is correct, there is something radically wrong in the classification. His remarks may be correct in respect of a particular season with a superabundant rainfall. In the season under report he says there was no rice sown in the first field. In the second the rice was planted out but there was no yield. The column for usual rotation in the tabulated statement shows that in the first field rice was grown in 1895-96, and in 1896-97 and 1897-98 not only was rice grown but second crops of gram also. The second field was cropped in precisely the same way in the same years. Mr. Modi's statement that rice is not *generally* sown is therefore inaccurate and there is no presumptive evidence indicating that the lands are too highly assessed although the occupants only got very middling second crops in a particular year. The first field got light dressings of ordinary manure in two of the last three years. The second field only got a light dressing once in the three years. The occupant may however manure the field every second year but such cannot be called liberal treatment for rice fields which also are capable of growing second crops.

The outturn results are tabulated as under but they need not for a moment be considered in judging the burden of assessment:—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Incidence of Assessment.
		Principal Product.	By-product.			
		As.	Lbs.			
First field	12	356	378	8 11 0	5 14 1	67·69
Second field	12	544	615	13 4 0	6 10 8	50·31

The experimenter has not valued by-products and has overestimated the crops at the average standard.

Panch Mahals.

Two experiments on *kodra*, one on *bājri* and one on *rāgi*, were to be carried out by the Assistant Collector; and one experiment each on rice and *kodra* and two on sesamum by the District Deputy Collector. Mr. Rendall did only one test on *bājri*. He could not find suitable fields of *kodra* and *rāgi* and was asked to take tests on gram and wheat instead. But later on being on plague duty he was exempted by the Collector from doing these experiments. Mr. Bharucha carried out the programme except that he did only one test on sesamum instead of two, the orders issued being misunderstood by him.

Mr. H. D. Rendall, Assistant Collector,

Submits one test (No. 8) on *bājri*. The explanatory notes show that the field was one of four in the village apparently reserved by the village officers for experiment owing to previous orders given through the Mámlatdár. The experimenter however says that the field selected showed a very fair crop, perhaps a little above the average of the *bājri* in the village, but not too much so "for purposes of experiment." The crop was even and one test area was

considered sufficient. The owner of the field is a man of means and is the occupant of many other numbers. The field grew before the tested crop (1) *bájri*, (2) *bájri*, and (3) *kodra* and *banti* in the previous three years.

Ten cart-loads of ordinary manure per acre were given for the crop experimented upon. The season is described as good and the tillage fairly good. The seed was drilled rather unseasonably in August at 17 lbs. per acre, a very much higher seed-rate than is necessary. The crop yielded 551 lbs. grain per acre. This is considered an average or 12-anna outturn. The grain is priced very low at 54½ lbs. per rupee. The assessment is Re. 1-5 per acre and the incidence of assessment works out 8.52 per cent.

Mr. S. M. Bharucha, District Deputy Collector,

Sends three experiments, one each on rice, *kodra* and sesamum. Three test areas aggregating 10 gunthas were selected in each field.

The rice field (Exp. No. 9) is an acre exactly in extent and bears an assessment of Rs. 2. It grows gram as a second crop apparently every year. The soil is brown. It contains salt and probably in an older settled district would bear a much higher assessment. No manure has been applied during the last two seasons; 12 loads per acre were given for the rice crop in 1896. The season for the tested crop was excellent and the cultivation is described as good. But the virgin fertility of this particular rice field will soon become exhausted if the cultivator continues his present exhaustive system of cultivation. The variety of rice grown was *Jádi Sutarsál*. The seed, 61 lbs. per acre, was broadcasted in July and yielded early in November 675 lbs. of sound grain and 41 lbs. of broken rice per acre. The aggregate value of this outturn and the useful by-product comes to Rs. 20-0-1 per acre. The incidence of assessment is 10 per cent. If the cultivation had been more liberal it might have been much less.

This officer's second test (No. 10) on *kodra* was taken on black stony land situate at the foot of a hill and assessed at Re. 0-11-3 per acre. The crops grown in the last three years were *banti* (*Panicum flavidum*), *rám-tal* (niger seed) and *kodra*. The sequence of cropping indicates that the soil is of light inferior quality. The cultivation is described as bad. The field being well stocked with thorns and weeds no manure is ever applied. The rainfall was exceptionally favourable and the outturn distinctly good. Twenty lbs. seed per acre broadcasted in July produced a crop which ripened in November and yielded 985 lbs. of grain per acre. The experimenter values the grain and useful by-products at only Rs. 7-5-7 per acre and this valuation even in a remote district is decidedly under actual value.

The sesamum field (Exp. No. 11) grows crops in undefined rotation. The number was waste for the last ten years. The occupant intends sowing *kodra* next year and then will again relinquish the number. The experimenter remarks that it is common in the Jhálod Mahál for lands of inferior quality to be occupied for a year or two and then relinquished. The time will probably come when the practice will be less common.

The seed was broadcasted in August. *Tal* can be sown seasonably even later. The crop was ripe at the beginning of December. The outturn, 222 lbs. seed per acre, is, I think, fairly satisfactory considering the indifferent cultivation. The reported seed-rate, 7½ lbs. per acre, is high even for a broadcasted crop. The gross value of outturn is only Rs. 7-15-8 per acre and the incidence 7.89 per cent.

Broach.

Mr. Painter was asked to take ordinary tests on *bájri*, *láng* (*Lathyrus sativus*) and cotton and also a special experiment on a holding growing *jowár* and cotton; Mr. Sorábsháh to conduct experiments in *jowár*, sesamum and rice. Mr. Painter did only one experiment on *jowár*. He could not find suitable *bájri* and *láng* fields near his camp which he was unable to leave owing to increased pressure of work on account of the plague. He was unable to test

cotton as its pickings last for several weeks and he could not consistently with other work encamp in one place for such a long period. Mr. Bharucha carried out experiments on rice and sesamum. He could not test *jowár* as he was engaged on plague duty when the crop ripened.

Mr. H. L. Painter, Assistant Collector,

Forwards one test on rabi *jowár* which is not included in the tabulated statement. The field has black soil. It is situate near salt marshes bordering on the sea but is not deteriorated thereby. Cotton and *jowár* are taken in alternate years. The season is described as very fair; the cultivation fair; but the outturn is very poor and probably much over-estimated at 8 annas. The reported seed-rate, 5 lbs. per acre, is below average. It is clear that the crop was poor and thin, there being only 21 bundles of *kadbi* reaped from the test area or 105 bundles per acre. The gross value of outturn comes to Rs. 7-12-7 per acre, the assessment being Rs. 3-12-9. This gives an incidence of 48·76 per cent., a startling figure which the experimenter should have endeavoured to explain.

Mr. Sorábsháh Hormasji, District Deputy Collector,

Submits two tests, one on rice and the other on *tal* (sesamum).

His report is full and clear, nearly all points of importance being intelligently reported. It is stated that the crops selected were average for the respective localities, presumably on the descriptions of soil represented. The season in each case is classed as fairly good and the cultivation as good. It is probable that the cultivation as described is more liberal both in respect of tillage and manure than the average cultivation of the Anklesvar taluka, which, in parts at least, is somewhat backward.

The rice field (Exp. No. 12) bears a high assessment of Rs. 12-4-5 per acre. It is divided into compartments each highly embanked and gets no artificial irrigation from a tank or otherwise. Its natural position for retaining water is very favourable. Otherwise it is impossible that the soil, which is described as *gorádu* or sandy, could hold in an average season sufficient water to mature rice. In 1897-98 a second crop of wheat was grown, the late rains being favourable, but a second crop is exceptional. A coarse variety of rice, *Jádu Sálu*, was grown. It ripened in the middle of October. A finer variety requiring more water would have taken longer to come to maturity. The experimenter reports the seed required for an acre of transplantation at 82 lbs., but the cultivator's seed-beds were neglected owing to an outbreak of plague. Presumably the occupant left this holding to take care of itself for the time being. He however bought seedlings and transplanted his field very seasonably on the 21st of July. The field was previously well tilled and manured with ordinary manure at 16 cart-loads per acre. The experimenter from hearsay evidence reports that an average outturn from the particular plot tested is 45 local maunds. His test indicated an outturn of $33\frac{3}{4}$ maunds only. So he estimates the crop at 9 annas. There can be little doubt that this is an under-estimate. The crop was probably full average. It yielded 1,847 lbs. grain and 1,950 lbs. straw together worth Rs. 47-15-6. The percentage incidence works out 25·59 per cent.

If there was any question of deficiency of water for rice in this particular area in an ordinary season the cultivator would, unless he is unusually hard up, protect himself by digging a well. Sub-soil water must be within easy range in such a position and in *gorádu* soils the actual digging to get water would be very inexpensive.

The sesamum test (No. 13) was also taken on sandy or *gorádu* soil assessed at Rs. 5-0-7 per acre. It looks as if both fields were within short distance of the Narbada, and that the soils are alluvial in character and probably resemble *bhattha*. The field grows *jowár* and sesamum in alternate years and is said to be manured annually at the rate of 7 carts per acre of ordinary manure. The arable area has wide headlands (*shedas*) of grass surrounding it. The seed, $1\frac{3}{4}$ lbs. per acre, was drilled in August and the crop ripened early in January, an indication that it was not forced to maturity by want of moisture. The crop is described as even. The experimenter further reports that superfluous seedlings were thinned out. These two facts together and the further fact that about 5

months elapsed between seed time and harvest leave no doubt that the crop was at least fairly good. Sesamum is recognised as a good rotation crop. It can be seasonably grown late. Therefore there is time to thoroughly clean and till the field. The *jowár* of the succeeding year thereby benefits. The crop, perhaps correctly estimated at 12 annas, yielded 326 lbs. seed valued at Rs. 19-13-6 per acre. The incidence of assessment works out 25·38 per cent. I may say from personal knowledge of the *táluka* that the burden of assessment is not probably so heavy on this number as on many black soil fields which are in impoverished condition, are farmed very badly and, in normal years, yield very poor crops.

Surat.

Three experiments on one or other of the following crops were directed to be made in the three sub-divisions :—

Chorási sub-division—*Jowár*, *bájrí*, rice, wheat and sugarcane.

Olpád sub-division.—*Jowár*, rice, cotton and gram.

Balsár sub-division.—*Rági*, *kodra*, rice and sugarcane.

In Chorási Mr. Vernon carried out one test each on rice and *bájrí*. He had also commenced an experiment on *jowár* when he gave over charge to Mr. Wales, who has completed and submitted it. In Olpád Mr. Kádri took three tests on *jowár*. And in Balsár Mr. Master did three tests on rice, one on *vál* and one on *kodra*.

Mr. C. V. Vernon, Assistant Collector,

Submits one test on *bájrí* and another on rice.

The *bájrí* (experiment not included) was grown with subordinate crops of *vál*, castors, *tuver* and *guvár* (*Cyamopsis psoralioides*) on old *bháttha* land which in occasional years is injuriously flooded by the *Tápti* when the river is in high flood. The most of the land in the belt referred to is deep alluvium of very fine quality with sweet water at a reasonable depth. Under wells sugarcane and other valuable irrigated crops are grown. In numbers where there are no wells mixed crops similar to that of the field of experiment are annually grown. Very often *jowár* is the cereal crop; the other most important crops are *vál* and castors. The *vál* beans, the variety is known as *Surti Pápdí*, are plucked green and sold as a green vegetable. In reaping the *jowár* a very long stubble is left and the *vál* trains itself on these supports. I doubt very much whether in an average season the cereal crop, *bájrí* or *jowár*, is the principal crop. But this would be impossible to determine by actual test because the *vál* beans are plucked during the season several times a week and the bunches of oil-seed are taken from the castor plants from time to time as they ripen. The cluster beans of the *guvár* are also plucked at short intervals and sold as green vegetables.

The field of experiment appears to be liberally farmed. The Koli occupant is a good cultivator. The character of the season is described as good. The *bájrí* outturn, which amounts to 786 lbs. grain and 2,648 lbs. fodder per acre, is valued at Rs. 23-4-11. The assessment is Rs. 13-8-5 per acre and the incidence of assessment works out 58·03 per cent. The assessment may be high, but Mr. Vernon's test does not by any means prove it to be so. The experiment was carried out on land which every one who knows the district knows to be very valuable.

The rice experiment (No. 14) was conducted on *besar* (clay-loam) soil which grows inferior rice, *Kada*, annually. The number measures 22 gunthas, of which only 16 were under rice, the rest under grass. The occupant is a Pársi of limited means. There are a good many hard-working Pársi cultivators in the Surat district and perhaps the cultivation did not suffer on account of the caste of the occupant. He perhaps did not tell the exact truth when he informed the experimenter that the field was manured at the rate of 27 cart-loads of manure per acre and that double that quantity was given to the seed-bed on which seedlings for transplantation were raised. The seed-bed was also rábed by burning litter and straw on it. The rice-bed gets water from a small natural tank for which no water-rate is paid. The season is described as poor, but it does not appear that the tank water failed. It is probable however that owing to failure of rain the

crop required more irrigation from the tank than usual and this extra irrigation would be expensive when water has to be lifted. The outturn comes to 2,058 lbs. grain and 1,680 lbs. straw together worth Rs. 57-10-6 per acre. I fancy the 10-anna estimate is too low. The assessment is Rs. 9-1-5 per acre and the incidence works out 15.76 per cent., a very moderate figure.

Messrs. C. V. Vernon and J. A. G. Wales, Assistant Collectors.

Mr. Wales reports a test on *jowár* which was carried out by Mr. Vernon (except threshing and weighing) before he gave over charge to Mr. Wales. The *jowár*, as usual in the Surat district, had *tuver* subordinate to it but the principal crop alone was tested. The *jowár* was a very middling crop and at the date of experiment it was impossible to determine with any accuracy whether the *tuver* would yield well or not. The experiment is not included in the tabulated statement.

The *jowár* yielded 558 lbs. grain and 350 bundles *kadbi* per acre, and I think the produce, both grain and *kadbi*, is undervalued. The gross value only comes to Rs. 14-15 per acre. The assessment is Rs. 7-8-8 per acre and the incidence works out 50.49 per cent. Experiments of this sort do not offer conclusive evidence regarding the burden of assessment. Therefore they should be discounted.

Mr. S. S. Kádri, District Deputy Collector,

Submits from the Olpád taluka three very useful tests on *jowár* which, for the descriptions of soils represented, are, in my opinion, *correctly* estimated as full crops or at the 16-anna standard. It is impossible to be certain about this. Throughout the taluka fields near the villages grow on an average much better crops than the outlying fields, and the eastern side of the taluka along the railway is much more fertile than the middle strip or the poorer coast villages. I find on a reference to the map that the villages are both in the more fertile strip.

The first field (Exp. No. 15) with its *gorát* soil is within easy distance of the Kim river, and the crops in such fields, particularly if near the Tápti, are usually distinctly better than those on black soil fields. The other two fields (Exp. Nos. 16 and 17) have ordinary black cotton soil. In each of the fields cotton and *jowár* are the usual crops. The *gorát* field was last manured in 1895-96 when it got a moderate dressing of ordinary manure. The second field got an application of three loads per acre for the tested crop. The third field was manured by folding goats. The season in each case is described as quite favourable; the cultivation as excellent in the first field and good in the others. The experimenter reports that the prices for both grain and *kadbi* were, exceptionally low. Those quoted are quite 20 per cent. lower than those ruling in ordinary years at the time of harvest and much lower than those prevailing later in the season.

The outturn results are tabulated as under :—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Incidence of Assessment.
		Principal Product.	By-product.			
		As.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.
First field (Exp. No. 15) ...	16	1,079	{ 1,547 kadbi 247 chaff	{ 26 4 6	5 10 4	21.48
Second field (Exp. No. 16) ...	16	897	{ 1,777 kadbi 152 chaff	{ 21 12 1	5 14 2	27.05
Third field (Exp. No. 17) ...	16	931	{ 1,633 kadbi 161 chaff	{ 22 9 5	5 4 2	23.28

The incidence is not low in any case, but in most seasons in many parts of Olpád the occupants of ordinary dry-crop black soil fields would consider themselves lucky if the burden of assessment was no heavier than the above figures indicate.

Mr. S. R. Master, District Deputy Collector,

Submits from the Balsár táluka three tests on rice and one each on *kodra* and *vál*.

The rice experiments were undertaken with a specific object in view. The experimenter when he was Mámlatdár of Balsár had complaints from the villagers of Mográ-vádi as to the high rates of assessments on their lands. The experimenter selected two fields growing rice in this village. The occupants in each case are Anavla Bráhmíns. The area of the first field is 15 gunthas, of the second 13 gunthas. The first is helped by irrigation from a tank, the second is embanked but only gets natural rainfall. The first field (Exp. Nos. 18 and 19) is classed as *bágáyat*. It bears an assessment of Rs. 19-10-8 per acre and grows sugarcane occasionally. It has *barad* soil which would probably be more correctly described as deep fertile moderately stiff loam. Second crops of *vál* are ordinarily grown and the second crop of this season was tested by the experimenter. The second field (experiment not included) has black soil. It grows in seasons of favourable late rainfall a second crop of *vál* or *láng*. In 1894 and 1895 second crops were grown but none after that. The assessment is Rs. 8-7-5 per acre. The rainfall was scant and this field suffered more than the other, there being no means of irrigation. The occupant of the first number said he put 20 cart-loads of ordinary manure on his little patch. The other was no quite so liberal, he only gave 10 cart-loads. The per acre applications work out 53 and 31 cart-loads respectively. I imagine both the Anavlas can exaggerate. In each field *Kada* rice, an inferior variety, was grown from seedlings transplanted seasonably in July.

In recording the outturn results as under I add the outturn of the second crop to the rice outturn of the first field.

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Incidence of Assessment.
		Principal Product.	By-product.			
	As.	Lbs.	Loads.	Rs. a. p.	Rs. a. p.	Per cent.
First field... {	Rice (Exp. No. 18) ...	12	1,808	2½	41 13 2	19 10 8 32.78
	Vál (Exp. No. 19) ...	10	622	670 lbs.	15 2 8	
				56 15 10		
Second field—Rice ...	14	973	1½	22 13 8	8 7 5	37.22

The burden of assessment appears to be high if the anna estimates are correct. I should hesitate to draw absolute conclusions from these tests and should like to see other tests taken in the same village by an officer of special experience.

Another experiment on rice (No. 20) is submitted by the same officer from another village, and he concludes from his results that the villagers of Atakpárdi are better off as regards the assessment than the people of Mográ-vádi. The field selected for this demonstration is 7 gunthas in area, of which the border occupied 1 guntha and the rice-bed 6. The actual area under rice was therefore about one-seventh of an acre. The experimenter does not report whether the occupant is again an Anavla Bráhmín or not, but says that the number occupies a very favourable position in respect of the water got from the tank for this and the other adjoining rice numbers. Five cart-loads of manure were used for the plot, that is, 28½ cart-loads per acre. The soil is pure black. Second crops of

*vd*l were grown in 1896-97 and 1897-98. None in 1894-95 or 1895-96. The *vd*l, which was sown after the tested crop, failed. The rainfall was scanty but apparently the rice did not suffer as the tank held sufficient water for irrigation.

Outturn results are as under :—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Incidence of Assessment.
		Principal Product.	By-product			
	As.	Lbs.	Carts.	Rs. a. p.	Rs. a. p.	Per cent.
Experiment No. 20	13	2,183	2½	49 11 3	12 13 9	25·87

This officer's *kodra* test (No. 21) was taken on the coast village Tithal. The number was grass for three years from 1894 to 1896. In 1897-98 castors were grown in the rabi season followed by the crop of experiment sown in the following monsoon. The seed was broadcasted at the rate of 34 lbs. per acre. The outturn of grain, 1,800 lbs per acre, is valued at Rs. 35-10-6. The by-product was neither weighed nor valued. The crop is under estimated at 12 annas. The assessment is Re. 1-7-9 per acre and the incidence only 4·16 per cent.

Tha'na.

Experiments on rice and sugarcane were ordered to be made in the Bassein Pránt, on rice and gram in the Kalyán Pránt and ordinary tests on *rági* and gram and a special experiment on a holding of about two acres growing a number of garden crops in the Máhim Pránt. Mr. Wood made no experiments as he had charge of the Forest Settlement Office in addition to his own. Mr. Shepherd carried out an experiment on rice and another on sugarcane. Mr. Monteath was engaged on plague duty and so did only one test on rice. Mr. Patvardhan was engaged in examining Jamábandi accounts at the time of *rági* harvest and later on he was on plague duty when the gram crops were ripe for test. He conducted however an ordinary experiment on rice and a special one on a garden land in the Máhim taluka.

Mr. W. C. Shepherd, Assistant Collector,

Forwards two tests, one on sugarcane and the other on rice.

The sugarcane experiment (No. 22) was taken on Agari *bágáyat* land which bears an assessment of Rs. 9-1-11 per acre and is irrigable from a private well. The field grows sweet potatoes, then sugarcane and is either fallowed or under rice in the third year. If rice is grown a liberal application of manure is given to that crop. The cane grown was the Bassein red or purple variety. The experimenter reports that 3,800 whole canes were required for the sets necessary to plant an acre. The tested crop yielded 30,450 canes per acre and may safely be classed as a good crop. The seed-rate as reported by the experimenter indicates that one acre of good cane will furnish sets for 8 acres; usually one acre of good cane will plant out 10 or 11 acres. The sets are always an expensive item in the cultivation charges and usually are worth not less than Rs. 50 per acre. The extent of irrigation is not reported, but no doubt water was given every 8 days or so for 11 or perhaps 12 months excepting in the monsoon, and as it was raised from a well, the cost of irrigation must have been high. The crop was liberally manured with castor cake, given in three applications in June, July and September, the aggregate quantity being 15 local *khandis* or 9,476 lbs. per acre. The *gul*-making is also an expensive item in the cultivator's expenditure. The experimenter expresses the opinion that the dearness of fuel as sold by Forest contractors has tended to decrease the sugarcane cultivation. A good deal of rotten palm wood was used as fuel. The crushed refuse from the canes is used for *ráb*. I have referred to the above items of expenditure because together they

would amount to probably over Rs. 300 per acre. A mill with wooden rollers was used to crush the cane, and the low percentage of juice expressed indicates that a good iron roller mill would be a profitable investment. Lime, 20 *tolas* per pan, was added to the juice to harden the *gul*. The *gul* is valued at 14½ lbs. per rupee or Rs. 17-4 per Poona *palla*, a price which is rarely obtained on an average.

Outturn details are as under :—

			Per Acre.
Number of canes	...	...	30,450
Weight of canes	...	...	79,840 lbs.
Weight of juice	...	...	49,090 lbs.
Weight of <i>gul</i> ...	...	...	9,538
Value of <i>gul</i> ...	...	...	Rs. 666-8-0
Incidence of assessment	...	...	1.37 per cent.
Percentage of juice to <i>gul</i>	...	...	61.48
Do. <i>gul</i> to juice...	...	...	19.43
Do. <i>gul</i> to cane...	...	...	11.94

The crop is, I think, correctly estimated at 14 annas.

The rice test (No. 23) area was taken on ordinary kharif land assessed at Rs. 9-0-11 per acre. The experimenter reports that it is currently believed that rice cultivation at Bándra leaves a very small margin of profit, because labour and manure are so dear. The Bándra rice cultivator enjoys advantages however which cultivators in districts more remote from a good market do not enjoy. For instance the experimenter reports that rice straw sometimes sells in Bándra at Rs. 10 or Rs. 12 per 100 bundles and he values the by-product of his experiment at Rs. 30 per acre.

The field was manured with fish manure at the rate of one cart-load per acre which cost Rs. 8. The crop was grown from transplanted seedlings but the proportionate area of seed-bed to area of transplantation is not stated, and it is not clear how the high seed-rate of 119 lbs. per acre could have been calculated. The outturn comes to 2,024 lbs. grain and 300 bundles straw per acre together worth Rs. 81. The local anna estimate is 12 to 14 annas. The incidence is 11.18 per cent.

Mr. G. Monteath, Assistant Collector,

Reports one experiment on rice. The sample *ser* received in this office was found to weigh 44½ *tolas* against 52½ *tolas* reported, thus giving a deficit of 7½ *tolas*. On reference the experimenter was unable to explain the difference, but says that it is possible that the rice may not have been sufficiently dry when he weighed it. I do not therefore think that the experiment should be reported in the tabulated statement. The field grows sweet rice every year but no second crop. The soil is black locally known as *garvi*. No manure was used for the field. The seed-bed, however, was raked as usual. 7½ cart-loads of grass and branch wood from *Injuli* or *jungle* trees were burnt on 1½ gunthas of seed-bed, and on this area of seed-bed 19 lbs. of seed produced sufficient seedlings for an acre of plantation. The seed-rate and the area of seed-bed are much under average. The season is described as good and tillage moderately good. The outturn came to 1,903 lbs. grain per acre which with 2,507 lbs. by-product was worth Rs. 38-4-1. The actual weight of grain if dryage is allowed for may be about one-seventh less than the outturn reported. The incidence 8.22 per cent. is moderate. Both the grain and straw are valued at low rates.

Mr. D. M. Patvardhan, District Deputy Collector,

Submits an ordinary experiment on rice and a special one on a holding which grew ginger, sugarcane and plantains.

The rice field (Exp. No. 24) is classed as ordinary kharif black soil. It bears an assessment of Rs. 4-14-2 per acre and grows rice annually without any second crop. Two varieties had been sown in the field, *viz.*, *Ghosálvel*, and

kālī dāngar (black rice). Each variety was tested, the test-area in each case being 4 gunthas. The field does not appear to have been manured. The seed-bed was however liberally rābed with cowdung and grass. It is reported that 72 lbs. seed broadcasted in the seed-bed produced seedlings sufficient for an acre of transplantation, but the basis of calculation is not shown. The outturn results from the two test areas are reported separately as under:—

				Outturn per 4 gunthas.		Value of Outturn from 4 gunthas.
				Grain.	By product.	
				Lbs.	Lbs.	
<i>Ghosālvel</i>	...	...	...	355	767	8 4 0
<i>Kālī dāngar</i>	...	...	...	224	320	4 10 11

The market rates for black rice were lower than for *Ghosālvel*. The whole number is just over 32 gunthas and it is remarkable that in such a small patch in a season which is described as very fair there should be such a difference in outturn between the two varieties. I am inclined to believe that there are reasons for the difference which the report does not disclose. It may be that the one variety was grown on the liberally rābed seed-bed and the other variety in the rest of the field which was unmanured. The gross value of outturn exceeds Rs. 80 per acre in one case and is about Rs. 47 per acre in the other. In estimating the actual outturn from the field the exact areas under each variety should have been determined. The straw is valued at 19½ cwts. per rupee, a strikingly different price from that reported by Mr. Shepherd as ruling at Bāndra, where, of course, the market rates are much higher than in the remote north of the Thāna district.

The ginger, sugarcane and plantain experiments (Nos. 25 to 27) were conducted in a small holding in Máhim. These crops are in the sequence named said to represent the ordinary rotation excepting that a portion of the holding is annually fallowed or is rābed and grows rice seedlings. The number is not correctly described as having black soil. It is in the belt of garden land which fringes the sea coast for a very considerable distance through Máhim and Bassein. The soil is deep alluvium sandy loam. No other kind of soil could successfully grow garden crops with the heavy rainfall of the district. The consistence of the soil is such that the rainfall soon drains away. Throughout the fair season there is the disadvantage that copious irrigation has to be given at very short intervals. The soil in some places is naturally so sandy that the cultivators bring from the more inland rice-beds large quantities of stiff clay soil to mix with the sand to alter its consistence and make it more retentive of moisture and of manure. The experimenter's notes show that the number is in extent 2 acres 33½ gunthas, of which 14½ gunthas were under ginger, 11½ under sugarcane, 27 gunthas under plantains and the remaining was fallow. This latter statement is not, I think, correct. It is not at all likely that more than half the garden area was fallow *throughout* the year. Plantains are in the ground more than 12 months from the time they are planted until they cease to be profitable. The experiments on ginger and sugarcane were conducted in May and probably at this time a good proportion of the land which is reported as fallow was only vacant. It is certain that a considerable portion had been occupied for a good part of the year by a plantation of plantains which in the ordinary course was dismantled as the trees became worn out, and a portion probably grew rice seedlings. The experimenter has got somewhat mixed up in his statements. He reports that the ginger, the plantains and the sugarcane each got three applications of castor cake in July, August and September. This may have been true in respect of the plantains and sugarcane, but could not certainly be the case as regards the ginger. It is reported to have ripened in May. It is usual to plant ginger in Máhim in May. Ordinarily six or seven months elapse between planting and lifting this crop. If market rates are low

the rhizomes may be left in the ground without irrigation for some time after they are ripe. The tested crop may have been planted in the rabi season. The experimenter reports that 2,800 lbs. of ginger all costing Rs. 133 were required to plant an acre. Half the reported quantity is quite sufficient. Again, I think, the occupant knew how to exaggerate when he said he applied castor cake to ginger at the rate of 20 local *khandis* per acre. This is equivalent to an application of 21,840 lbs. per acre or nearly 10 tons! There are indications of exalted extravagance in this experiment throughout. The outturn comes to 17,360 lbs. of principal product and 740 lbs. of by-product, the latter reported to be used for pickles, together worth Rs. 831-10-8 per acre. I do not know what is wrong with these figures, but it may be accepted as certain that the occupant did not actually get from his crop anything like the price which they indicate.

The test on sugarcane (No. 26) is more satisfactory. It is 11 or 12 months' crop planted in May. Sets sufficient for an acre were got from 2,050 whole canes. The crop was watered at short intervals until the burst of the monsoon by carrying water in earthenware pots from the well to the crop. This is a common practice at Máhim at this season. It economises water, the loss by leakage from an earthen channel of water in such sandy soil being great. Water is usually very scant in the wells at this particular time. No irrigation is required in the monsoon. The castor cake manure was given in three applications in July, August and September, but none before plantation. The total application was 8 local *khandis* or 8,736 lbs. which was estimated to have cost Rs. 124 per acre, when applied. The sets were planted in the first instance in furrows which after the crop was handweeded and manured in July were filled in with earth taken from adjoining land. The operation appears to have been repeated at each application of manure. Finally after the rains the canes were wrapped up and tied together. The former prevents damage by jackals; the latter prevents the canes lodging in the case of a heavy crop. No further attention was given to the crop except regular irrigation once a week throughout the fair season. The Máhim sugarcane crops are chiefly used for raw eating, not for *gul*. The canes are sent to Bombay or Surat.

The yield per acre comes to 16,400 canes, 47,560 lbs. in weight, and 13,120 lbs. by-product, together worth Rs. 244-12-8. The weight of cane indicates that the crop was a middling one, about two-thirds of a fairly good crop in the Poona district. The field is assessed at Rs. 5-10-3 per acre.

This officer's next test (No. 27) was on *Rájeli* plantains. The cultivation in this Presidency of this variety is confined to the Máhim and Bassein talukas of Thána. The *Rájeli* is the only variety from which preserved or dried plantains are made. The crop was grown in the same number as that referred to in the two previous experiments. A catch crop of *udid* was apparently got off the land before the young shoots were planted out. The experimenter says that the rotation is ginger, sugarcane and plantains. The sugarcane, we know, is ready in May. A whole year must have elapsed before the plantains were planted; because it is reported that the plantain shoots were planted out in June nearly 9 feet apart and 720 per acre. The date of the experiment is 30th June and the area is reported as 4 gunthas. I assume that the experimenter merely inspected the plantation. Bunches of plantains would not be all equally ripe on a particular 4-guntha patch on a particular day though this particular variety is planted so that the bunches ripen mostly in the fair season, not in the rains, so that the fruit can be dried and preserved. In calculating the value of outturn from a plantain plantation the prices which prevail throughout the season must be taken into consideration, not those which rule on a particular day. The experimenter reports that in 12 months the 720 shoots produced 720 bunches, also three young shoots per tree, which for replanting have a recognised value, and other by-products such as leaf and sheath in definite proportion to the number of the original shoots planted. All this is to some extent conjecture gathered from hearsay evidence which is not to be trusted, and the value of the crop reported, Rs. 448-5 per acre, might be approximately correct, but is more likely to be not. Moreover, the income, whatever it may be, is spread over a longer period than 12 months.

CENTRAL DIVISION.

Kha'ndesh.

Each experimenter was directed to take two tests on rice, one on sesamum and one on gram. Duties in connection with the plague and absence of a suitable crop near his camp prevented Mr. Hatch from experimenting on rice. Mr. Keatinge, who took over charge from him later on, intended to do a test in gram but on enquiry found it all cut. Mr. Varley omitted the sesamum experiment as the crop was all reaped before he returned from leave. He, however, carried out two tests on rice and one on gram required of him. Mr. Shalom conducted one experiment each on sesamum, rice and gram. He intended to do one more test on *gorad* rice raised in beds of *nālas* in Taloda and reaped in April but was prevented by his transfer. Mr. Joshi was in charge of two sub-divisions and so could not start earlier when sesamum crops could have been found standing. He did the other experiments. Mr. Sitaram Dāmodar made no experiments at all. Sesamum was all cut before the orders reached him; rice was only sparingly grown in his charge and so no suitable crops could be found; and at the time the gram crop was ready for harvest he had to be present for announcing revised survey rates in the Dhulia taluka.

Mr. Wilkins, Superintendent, Land Records and Agriculture, C. D., carried out a test on linseed in this district.

Mr. F. J. Varley, Assistant Collector,

Submits two tests on rice and one on gram.

The second rice test I cannot report because the test area was not selected with discrimination. The crop only yielded 127 lbs. grain per acre. No manure was given. The cultivation is described as bad and in the field there were 5 mango trees which the experimenter reports "prevented the rice from ripening." Away from the trees the crop was good but the area selected for experiment was near the trees.

The first field (Exp. No. 28) is assessed as ordinary dry-crop at revision survey at Re. 1-5-2 per acre. A private well has been constructed since settlement and this is now available for the rice. The variety of grain was *Dodki Sāl*. The soil is described as black *Rai Chikani*; the latter term means that it is sticky when wet and retentive of moisture. The extent of irrigation is not reported. The reported rotation indicates that rice is only grown occasionally. A variety of crops is grown, viz., cotton, *bājri*, *jowāri*, wheat, *rātāle* (sweet potatoes) and rice; the three latter crops probably only under the portion commanded by the well. Excluding *pōt kharāb* the whole number measures 16 acres 25 gunthas. The rice patch was manured at the rate of 12 cart-loads per acre. Manure is said to be given to the *field* every third year. Probably if the cultivator has any sense the patch under irrigation gets manure every year. The rice was a drilled crop. The seed-rate, 28 lbs. per acre, is low. The crop yielded in the middle of November 649 lbs. grain and 1,723 lbs. by-product together worth Rs. 21-14-10 per acre. The incidence of assessment works out 6.03 per cent.

The gram test (not included in tabular statement) was taken in a field one of several selected by the Māmlatdār. The soil is black and bears an assessment of Rs. 2-2-11 per acre. The gram was a second crop after *bājri*. The experimenter reports, however, that the gram was drilled in September. If this was so the *bājri* crop ripened prematurely and must have been very poor. The gram outturn indicates a very poor crop, being only 185 lbs. pulse and 318 lbs. by-product per acre. The gross value is only Rs. 7-8 per acre and the incidence 29.09 per cent. It is impossible to judge from this experiment whether the burden of assessment is fair or not.

Mr. Shálom Bápuji, District Deputy Collector,

Sends three tests, one each on rice, sesamum and gram.

The weights of samples of measure *ser*s as found in this office vary considerably from those recorded by the experimenter. He explains in reply to a reference that he weighed the contents of the *ser* measure with a scale balance in small quantities at a time with 30 rupees as a counterpoise. If the samples sent by the experimenter were in each case the exact contents of a sample *ser* the outturns as reported are from 5 to 8 per cent. less than they ought to be.

The rice (Exp. No. 29) was a broadcasted crop which was grown on medium black soil, assessed at Rs. 3-0-10 per acre. The field gets water from a canal. The extent of irrigation is not reported. A water-rate is presumably charged by the Irrigation Department as the assessment does not include any special water-rate fixed at settlement. The experimenter's report is sketchy. The rice is said to have been manured with 25 cart-loads per acre of ordinary manure and sown in September. But this latter statement is wrong as the test was taken at the end of November and rice takes much longer than $2\frac{1}{2}$ or 3 months to come to maturity. The variety was *sáti*, the seed-rate 60 lbs. per acre and the outturn 2,264 lbs. grain, 3,325 lbs. straw and 475 lbs. chaff per acre. This represents much more than a 10 or 11-anna crop as estimated by the experimenter. Both grain and straw have been valued rather low at $56\frac{1}{2}$ lbs. and $13\frac{1}{4}$ cwt.s. respectively per rupee. The gross value of outturn comes to Rs. 42-8 per acre.

The sesamum field (experiment not included), which also has medium black soil, is assessed at Rs. 2-5-9 per acre and grew wheat in 1896-97 and *báji* and *mug* in 1897-98. No manure was given. The tillage is described as fair and season may be classed as moderately favourable. The seed, over 3 lbs. per acre, was drilled in September, the usual sowing season for *tíl* in Khándesh. One lb. of seed per acre is ample but it is difficult to distribute evenly such a small quantity. More seed than required is generally sown and superfluous seedlings thinned out. The crop yielded in December 221 lbs. oil-seed per acre. This is called a 9-anna crop and valued at Rs. 10-9-2 per acre. The incidence is 22·3 per cent.

The gram (Exp. No. 30) was grown in black soil which usually grows cotton and *jowári*. The assessment is Rs. 2-10-3 per acre. The cultivation is described as fair and the season favourable. The seed was sown in furrows made by a plough in October. This is a common and excellent method of sowing; but in this way more seed is generally required than with a drill. The reported seed-rate is 71 lbs. per acre. The crop yielded 409 lbs. pulse, 210 lbs. chaff and 490 lbs. stems per acre. The latter is ordinarily considered more or less useless as fodder. The outturn estimated as a 10-anna crop is valued at Rs. 13-12 per acre. The incidence works out to 19·20 per cent.

Mr. S. C. Joshi, District Deputy Collector,

Submits two tests on rice and one on gram.

The rice fields (Exp. Nos. 31 and 32) were favourably situated patches in dry-crop numbers, the revision rates for the first field being Re. 1-3-6 per acre and for the second field Re. 0-9-2. The rotation is undefined. Perhaps these patches by embanking and other improvements may be converted into proper rice-beds in time; but under existing conditions they probably would be more profitably employed in growing ordinary dry crops. The first field can get water from a private well which has been constructed since the revision settlement. The crops got two waterings. The second field was four times irrigated by water from a canal, the charge being Re. 1 per acre. This crop was grown from transplanted seedlings. The other was a drilled crop. The fields got dressings of approximately 17 and 18 cart-loads per acre of ordinary manure. The tillage is described as indifferent and season ordinary. The seed-rates are much underestimated at $11\frac{1}{4}$ and 16 lbs. per acre; or sufficient seed was not sown. The seed-bed for the second field, $\frac{5}{8}$ guntha per acre of transplantation, was also very

much too small. I fear the cultivators were disappointed with results which are tabulated as under:—

	Crop.	Anna Esti- mates.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Incidence of Assessment.
			Principal Product.	By- product.			
		Rs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.
First field (Exp. No. 31) ...	Dodaki Rice.	10	367	1,086	9 6 0	1 3 6	13-0
Second field (Exp. No. 32) ...	Sukwel ...	10	291	1,330	9 6 0	0 9 2	6-11

This officer's gram test (No. 33) was conducted on better black soil assessed at Rs. 2-14 per acre. The field grows cotton and *jowari*. No manure was given for the gram and the cultivation is described as indifferent. Good results could not be expected unless with liberal cultivation. One of the objects of a good cultivator in introducing gram into the ordinary cotton *jowari* rotation is to get an opportunity of thoroughly cleaning his field. He has ample time and opportunity to do so during the monsoon as the gram need not be sown before September-October. The crop was drilled seasonably, the reported seed-rate, 44 lbs. per acre, being about right. The gram ripened early in February and yielded 443 lbs. pulse and 554 lbs. useful fodder per acre together worth Rs. 13-4. The pulse is priced low at 37 lbs. per rupee. The incidence comes to 21-69 per cent. The crop is estimated at 10 annas. With more liberal treatment the field would no doubt give much better results in a good average year.

Mr. W. D. Wilkins, Superintendent, Land Records and Agriculture, C.D.,

Forwards an experiment on linseed from this district. The test is unsatisfactory and is not included in the tabular statement. The outturn is very poor. The experimenter's notes show that this field, 7 acres 25 gunthas in extent, was about half reaped when he selected his test areas. The crop is reported to have been level all over and was estimated by the villagers at 12 annas. The soil is reddish black of the first order, and was manured at the rate of 10½ carts per acre. A dressing is given every second year. The season is described as somewhat favourable and the tillage good. The report shows that the field was ploughed in May and June and harrowed four times in July. Then sesamum was sown, and failed. Subsequently the field was harrowed six times and linseed was sown in September. The reported seed-rate, 10 lbs. per acre, was about average. The crop was reaped on the 23rd January and yielded 125 lbs. of oil-seed worth Rs. 6-0-8 per acre. If the crop was level and the plants healthy, it ought to have yielded three or four times the outturn reported. Linseed is occasionally affected by rust, the effect of which would not be seen by a casual observer. The plants are not thereby much affected in growth or appearance, but many of the pods are empty or contain a few shrivelled seeds. Perhaps Mr. Wilkins' test was taken on a diseased crop.

The number was purchased by the registered occupant about 50 years ago for Rs. 125, or about 11½ times the assessment. He is the holder of many other numbers, is well-to-do and lives in Dhulia. His sons and nephews attend to the cultivation of his fields.

Na'sik.

Mr. Simcox carried out an experiment on cotton and another on linseed. He was prevented from doing a test on groundnut required of him owing to his being engaged on political duty at the time the crop ripened. Mr. Motilal did an experiment on sugarcane. His omission to experiment on *jowari* and cotton has been unexplained. Mr. Plunkett worked out the programme settled.

Mr. W. D. Wilkins, Superintendent, Land Records and Agriculture, C. D., conducted two experiments on wheat and gram in this district.

Mr. A. H. A. Simcox, Assistant Collector,

Submits an experiment on cotton and another on linseed. The cotton outturn represents about three times that of an average Násik crop; that from the linseed is very poor.

The cotton field (Exp. No. 34) is reported to be a good specimen of ordinary land having black soil with no fault, which is sometimes irrigated and sometimes not. The ordinary rotation is not reported. The cultivator intends growing wheat after *bájri* next year. Mr. Simcox says "the crop was carefully watched when being cut and no tampering with the selected portion was attempted." It is not at all clear how the experiment was conducted. The test area is 10 gunthas. The date of experiment is 10th November. But in Násik as elsewhere cotton must be picked several times at intervals. The bolls do not open all at the same time and it would be impossible to get all the produce in one day. The seed-rate 41 lbs. and the outturn 1,019 lbs. seed cotton per acre are each much over average.

The linseed (experiment not included) was grown also on black soil. Safflower (*kardái*) was a subordinate crop but was not tested. There is no usual rotation. No manure was applied for 3 years. The season is described as fair and cultivation indifferent. The result is an outturn of linseed worth Rs. 4-8 per acre and an estimated outturn of safflower worth Re. 1 per acre. This is called a 9-anna crop.

Mr. Motilál Chunilál, District Deputy Collector,

Submits a sugarcane test (No. 35). Meagre details are given in the report. The soil is black. The field is 3 acres 14 gunthas in extent and the revision assessment for the soil is Rs. 10-8 and for water Rs. 5 or together Rs. 4-10 per acre. Well and *pát* irrigation is available. The Poona *Pundia* variety of cane was grown. Apparently it occupied the whole area. The crops grown in the two previous years were—

1896-97...	...	...	Groundnut, sesamum, wheat and gram.
1897-98...	...	...	<i>Bájri</i> with subordinate pulse, &c., mixture.

The crop was a 12-month one planted in January. The sets were deeply imbedded in the mud of the previously irrigated beds in the usual Poona way. Season was favourable and tillage good. The application of manure, 20 cart-loads of cowdung per acre, was not particularly liberal. The crop yielded 5,590 lbs. of *gul* per acre which is valued at a moderately high rate of Rs. 15 per *palla* of 120 *sers* or about 240 lbs. The value of by-product may be left out of account as fuel has to be provided for boiling the juice and usually more than the crushed cane is required for the purpose and the green tops are fed to the cattle working the mill. The *gul* was worth Rs. 340-10 per acre. The occupant is a Bráhmín and Kulkarni of the village.

Mr. W. Plunkett, District Deputy Collector,

Submitted two experiments on *nágli* and one on wheat which are carefully and fully reported.

The *nágli* tests were taken in the same village and the conditions of occupancy of each number and the results of the experiments may be usefully contrasted for various reasons.

The first field (Exp. No. 36) belonged to a Márwádi, who bought it from a Kunbi and lets it to a Koli for Rs. 21 per annum, the revision assessment being Rs. 5. The Koli has no land of his own, and owns two bullocks. The extent of the number is 4 acres 24 gunthas; $3\frac{1}{2}$ acres of this are assessed as *bágáyat* but there is no proper well. A small *budki* on the bank of the river which bounds the field is not used. The whole area is cultivated as dry crop and gram in a small portion of the field is usually a second crop after *nágli*. The column for usual rotation shows there is no definite sequence of crops. In the last three years the field was fallow one year, another year hemp was grown and in the third

nágli, wheat, linseed and chillies. The experimenter says, in respect of the tested crop, that ploughing, harrowing, weeding and watching were attended to in proper season. The field slopes and the crop on the higher level was far inferior to that on the lower. The test area was chosen to get a fair average. No manure was applied. The Koli bought the *nágli* seedlings, employed 8 labourers to transplant them and spent altogether Rs. 11 in hired labour.

The second field (Exp. No. 37) is owned by a Kunbi who owns in the village 2 acres and 32 gunthas assessed at Rs. 19 and other land in neighbouring villages. He has a pair of bullocks, a pair of he-buffaloes and a milk buffalo.

The number is situate on the bank of the Kásardi river and is alluvial. It lay waste for years and the tested crop was the second *nágli* crop taken since the land was broken up for cultivation. Only half the number has been reclaimed. The other half no doubt has always grown good grass. The area sown is reported to have been manured with cowdung at the rate of $23\frac{1}{2}$ carts per acre. The various tillage and cultivation operations were properly attended to. The soil is mixed alluvium like that of the other field. Mr. Plunkett does not think the Kunbi made much profit as he gave most of his personal attention to other irrigated lands and cultivated this number by hired labour. He spent on the 17 gunthas cropped Rs. 12-4 for hired labour and cost of seedlings or more than the Koli spent on his whole holding.

Outturn results from each field are as under :—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Percentage of Incidence of Assessment.
		Principal Product.	By-product.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.
Koli's field (Exp. No. 36) ...	10	752	600	19 13 8	1 1 4	5.45
Kunbi's field (Exp. No. 37)...	12	1,687	1,720	47 8 5	1 4 0	2.63

The samples of measured *sers* forwarded by the experimenter weighed more than weights reported. The differences, which are considerable, are shown below :—

		Weight recorded by Experimenter.	Weight as found in Director's office.	Difference.
		Tolas.	Tolas.	
Experiment No. 36 ...	...	91½	97	+5½
Do. „ 37 ...	...	86¼	91½	+5¼

Mr. Plunkett's third test (No. 38) was on *kátha* wheat, an irrigated crop grown on good black soil. The field is 5 acres.12 gunthás in extent and bears an assessment of Rs. 10 for soil and Rs. 35 for water. It has a well but it is irrigated from a channel. The crops grown during the last three years were hemp and sugarcane in the first year, groundnut in the second, and *methi*, wheat and rice in the third.

The field belongs to a Kunbi who owns in the village 14 acres 15 gunthas assessed at Rs. 115. He owns 6 pairs of bullocks, 4 cows and 2 milk buffaloes. It is not clear why so many work cattle are kept unless more land is owned elsewhere. The field is manured annually but it is entirely improbable that the reported application of this year, 75 loads per acre, could have been given. The occupant said he bought 30 carts of manure for the whole land he owns in addition to his home supply. This is not at all unlikely.

The seed was drilled in October and the crop ripened in March. The seed-rate is reported at 83 lbs. per acre and the outturn comes to 1,436 lbs. grain and about 800 lbs. straw per acre. The latter is, I think, an incorrect estimate and not sufficiently high for the weight of grain produced. The experimenter does not value it. He says the by-product is not sold but used as fodder for cattle by the cultivators. Cattle eat it when mixed with grain or some other chaff. Consequently no value of the by-product can be ascertained. The value of the grain alone comes to Rs. 39-6 per acre and the incidence works out 21·56 per cent. It is a great advantage having channel water, the cost of irrigation being trifling as compared with that from a well. I do not think the incidence of assessment, all things considered, high.

Mr. W. D. Wilkins, Superintendent, Land Records and Agriculture, C. D.,

Submits two experiments from this district, one on wheat and another on gram.

The wheat field (Exp. No. 39) has reddish black soil and grows wheat and *bājri* alternately. No manure was given. The field appears to have been once ploughed in June and twice harrowed subsequently. The wheat was drilled about *Dasara* with a three-coulter drill, the seed-rate being 76 lbs. per acre. The rain was sufficient before sowing but there was only one light shower a month afterwards. The crop was hand-weeded with *khurpa* and ripened in four months. The yield estimated as a 10-anna crop comes to 497 lbs. grain and 565 lbs. straw together worth Rs. 17-15. The incidence is 6·44 per cent.

Mr. Wilkins reports that the registered occupant owns the number and many others by inheritance. "He has taken a loan of Rs. 1,200 without interest. He has borrowed Rs. 300 at 8 annas interest per cent. per mensem and has mortgaged his share of survey number under experiment and of three others. The mortgagee sublets the portion under experiment for Rs. 30 per annum on condition that the assessment should be paid by the mortgagee and the expenses of cultivation should be borne by the cultivator and that no remission should be given in case crop failed." This account hardly makes the financial position of the occupant quite clear.

Mr. Wilkins' second test (No. 40) was on irrigated gram, a second crop after *bājri*. The field has black soil of superior quality. Part is assessed as *bāgāyat*, part as dry-crop. The gram was grown in the *bāgāyat* portion, the assessment of which is Rs. 2-9-7 per acre. A well apparently irrigates more than the *bāgāyat* portion. In October the *bājri* stubble was grubbed up by working the *moghad*. This is a toothed implement with either two or three teeth resembling a heavy seed drill with seed bowl and seed tubes removed, and its effect on soft soil would equal that of a light plough. It was worked twice. The soil being dry it was once irrigated before the seed was sown. No manure was given and it does not appear that the field was laid out for regular irrigation. In the case of gram this is perhaps unnecessary as in an average season two waterings are all that are necessary to bring the crop to maturity. If irrigation of this kind only is intended, the water is led over the surface to flood the field in the best way the cultivator can arrange. It is reported that only two-thirds of the area under gram was watered, the available supply in the well being required mostly for wheat. The seed-rate as reported, 114 lbs. per acre, is considerably over average.

The crop was somewhat uneven and the test area was selected so that it covered even and uneven crop in fair proportion. The outturn, 1,417 lbs. pulse and 1,100 lbs. chaff per acre, represents much more than the 10-anna crop as estimated by the experimenter. The gross outturn is valued at Rs. 46-15-6 per acre and the incidence is only 5·53 per cent.

Mr. Wilkins reports that the number is owned by an uncle and nephew. The former has two-thirds share. He sublets on the condition that the cultivator gives as rent half the produce of the *bāgāyat* land and two-thirds of the *jirāyat*. Seed is provided half and half by owner and tenant. Assessment is paid by the owner; cultivation and other expenses by the tenant. The burden of assessment evidently weighs highly on the owner if the above statement is correct. But it is very doubtful whether the tenant is by any means so well circumstanced.

Ahmadnagar.

Mr. Anderson was asked to do two experiments on *bājri* and one on *jowári*, Mr. Wilkinson one on *bājri* and two on *jowári* and the District Deputy Collector one each on *jowári*, *bājri* and wheat. As Mr. Anderson found the *jowári* and *bājri* crops all reaped while he was on special duty in Akola he selected for his tests other crops rather than allow the season to pass away. Thus he made one experiment on rice, two on wheat and one on gram. He also tried to do a test on *naḡli*, but had to leave it unfinished owing to exigencies of other work. Mr. Wilkinson's omission to carry out the *bājri* experiment required of him and Mr. Pendse's selection of gram in lieu of that crop have not been explained.

Mr. F. G. H. Anderson, Assistant Collector,

Submits four carefully conducted tests, one on rice, two on wheat and one on gram.

The rice field (Exp. No. 41) has the ordinary loamy soil of the *gháts*. It grows rice every year followed by wheat or other second crop. *Jirvel* and *rāya-bhog* equally mixed were the varieties grown. The field is irrigable from a stream. The crop was grown from rábed seedlings. The experimenter says that "the seed-rates per acre and other such matters are so difficult to ascertain where the ráb bed is used that I did not attempt it: they would all depend on vague and often inaccurate information." Season and tillage are each described as normal. The crop was estimated locally at 12 annas and yielded 987 lbs. grain per acre which together with the straw is valued at Rs. 30-2-11. The straw is priced low at Re. 1-10-8 per acre. The value of the straw was ascertained by estimation. The experimenter says that in Akola grass is plentiful and hardly any value is set on rice straw. The incidence of assessment works out to 6.49 per cent. Mr. Anderson reports that he saw on the same field capital crop of wheat later in the season. With regard to the rice outturn he observes: "I am surprised at the small outturn, and knowing that the people at Váki are not very particular if they can get a chance of cheating the *Sarkár*, I suspect that some trick was played, though how I cannot say. I could not stand by the threshing floor for two days while the crop dried. But I left a guard and there was no visible diminution of the number of bundles. The outturn in pounds is less considerably than the formulæ though the crop was an excellent one; it may be that the rice above *gháts* gives a lighter outturn than the below-*ghát* formulæ."

Irrigated black awned *bakshi* wheat (Exp. No. 42) as a second crop probably after *bājri* yielded well. The variety is not grown except under good wells and with plenty of manure. The field carries usually two crops every year, *bājri* being the rain crop. It is followed by vegetables and other irrigated crops in no fixed rotation. The field has medium black soil and bears an assessment of Re. 0-12-8 per acre and is irrigated by a well built recently by means of tagái. Well-rotted farm-yard manure and back-yard sweepings, perhaps about 10 tons per acre, were applied before sowing. Cultivation was good. Slight damage had been done to the crop by rats. The seed was broadcasted at the rate of 111 lbs. per acre which even for an irrigated crop is a high seed-rate. The outturn of grain is 1,191 lbs. per acre. The gross value of produce amounts to Rs. 41-13-9. The incidence of assessment comes to 1.89 per cent. This is on the second crop only but need not be considered unusually low as the cost of cultivation is necessarily high.

The soil of the field selected for the third experiment (No. 43) is also medium black. It bears an assessment of Re. 1-3-4 per acre. The field grows *bājri* in the kharif season and wheat, gram, &c., in the rabi under irrigation. The season was unfavourable for the tested crop because the late rains were scant and the well which irrigates the field did not hold sufficient water for the whole area under it. The experimenter reports that this crop of *kátha* wheat was selected as a medium crop but was perhaps poorer by an anna or so than crops seen later. No manure was applied. The reported seed-rate is 45 lbs. per acre. The crop was estimated to be a 6-anna one and yielded 667 lbs. grain per acre. The straw was not weighed but its value was estimated. The value of grain and straw is

Rs. 23.7 per acre. The incidence of assessment on the second crop only works out 5.15 per cent.

This officer's last test (No. 44) was on gram. The soil is of the same class as in the last test and the same system of cropping is followed. No manure was given. The experimenter says the test area was a medium strip in a field with a good and a bad end, and was a fair sample of all the gram in the neighbourhood, but in comparison with crops seen afterwards slightly above the average of the season. The crop estimated at 7 annas yielded 593 lbs. pulse per acre, which at a market rate, which is rather low, comes to Rs. 14-10-2 per acre. The incidence of the second crop comes to 8.39 per cent.

Mr. Anderson's experiments on rabi crops were all on lands protected by wells but only in the case of the *bakshi* wheat was the amount of water sufficient; the other lands were just watered enough to stave off drought.

Mr. W. H. J. Wilkinson, Assistant Collector,

Forwards two tests on *jowári*.

The *jowári* experiments were taken on black-soil, *kálpoti*, fields, the first of which is irrigable by means of a well but the extent of irrigation is not reported. The second is purely dry crop. The respective assessments are Re. 1-0-10 and Re. 0-11-1 per acre.

The first field (Exp. No. 45) grows a variety of crops but principally *jowári* and wheat with smaller areas annually of garden crops, as chillies, groundnut, sweet potatoes, *rājgira*, &c. The second field (experiment not included) grows *jowári* with subordinate *kardai* (safflower), gram and *bājri* with subordinate pulses in irregular rotation. The subordinate *kardai* in the second field was not tested. The field got no manure. The experimenter makes the significant remark "*jiráyat* fields are not manured;" and says that *bágáyat* fields require nearly 25 carts of manure per acre. The manure used for the tested crops was probably the ordinary stuff usually available. It is not likely that it was as reported made up of hay and ashes. Tillage is described as good in the first case, but indifferent in the second. For the dry-crop field the rainfall was insufficient and untimely. If there was insufficient water in the well the outturn from the *bágáyat* field would also have suffered owing to unfavourable season.

The outturn results are compared as under :—

	Anna Estimate.	OUTTURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Incidence of Assessment.
		Principal Product.	By-product.			
	Rs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.
First field (Exp. No. 45) ...	12	1,625	3,900	34 7 2	1 0 10	3.05
Second field ...	4	106	320	3 7 8	0 11 1	19.91

The grain is valued at cheap rates in both experiments: 61½ lbs. per rupee in the first and 58 lbs. in the second. *Kadbi* is valued at 4½ cwt. per rupee in the first experiment and 1½ cwt. per rupee in the other. The former is a cheap rate; the latter in ordinary seasons dear.

The incidence works high in the dry-crop field but the crop was very poor and this the local estimate in annas indicates but not sufficiently so. Moreover the outturn of the subordinate crop is not included.

Mr. N. K. Pendse, District Deputy Collector,

Submits three experiments, one each on gram, *jowári* and wheat.

The gram (experiment not included) was grown mixed in minor proportion with *jowári* and safflower. The two subordinate crops were not tested. The soil

is black but not pure black. It is said to contain pieces of flint here and there. It grows in irregular rotation the crops named, also wheat and linseed, the latter crop this year occupying only a small patch in the number. The field like much of the dry-crop land in the district was fallow in 1896-97, the famine year. The cultivation is described as fair. No manure was applied. The season is also called fair in the tabulated statement but the experimenter's notes show that it was unfavourable. The seed was sown late in September or early in October after a few showers. The soil did not hold sufficient moisture for properly maturing the crop and there was no rain at *Divdi* as usual.

The outturn is 237 lbs. of pulse and 213 lbs. useful by-product both worth per acre Rs. 5-6-2. Both pulse and fodder are valued at exceedingly low rates, the former at $46\frac{1}{6}$ lbs., the latter at $7\frac{4}{7}$ cwts. per rupee.

The second test (No. 46) was taken on rabi *jowári* with safflower as usual subordinate. The latter crop was not tested. The soil is again black but not pure deep black. The field as in the first experiment was fallow in the famine year 1896-97. It grows cotton, *jowári* and, as subordinate crops, *tur*, *ambádi*, *kardai*, &c; but there is no defined rotation. No manure is ever used in this field. Under the circumstances the outturn must be considered by no means unsatisfactory. It amounts to 691 lbs. grain and 2,302 lbs. *kadbi* and chaff together worth Rs. 15-0-11. Again both principal and by-product are valued at low rates. The crop is classed at 10 annas. The assessment is Re. 1-4-3 per acre and the incidence works out 8.41 per cent.

Mr. Pendse's third test (No. 47) on wheat with subordinate safflower was taken in the Shrigonda taluka. The occupant of the field was lucky enough to get a crop in 1896-97; not however an uncommon occurrence on good black soil in this taluka in the famine year. The crops grown before the crop of experiment in the three preceding years were—(1) wheat, (2) *jowári* and (3) gram, with safflower subordinate in each case. The season is described as ordinary. The tillage good but no manure is ever used in this land.

The wheat as well as the *kardai* were tested and the outturn may be considered quite satisfactory for an average season under condition of cultivation as referred to above. The crop yielded 516 lbs. grain and 590 lbs. useful fodder per acre from the wheat and 63 lbs. of oil-seed from the *kardai*. The gross value is Rs. 18-7-2 per acre. The assessment is Re. 1-3-10 per acre and incidence of assessment 6.72 per cent.

Poona.

Experiments on *bájrí*, linseed and sesamum were ordered in the eastern and on rice, groundnut and wheat in the western sub-division. Mr. Sale was unable to find a suitable sesamum crop and so chose wheat instead. The wheat in Junnar which Mr. Crofton was asked to test was all cut before he could arrange to get there. He therefore tested the same crop in Mával.

Mr. E. L. Sale, Assistant Collector, Poona,

Submits three tests one each on *bájrí*, linseed and wheat.

The *bájrí* field (Exp. No. 48) has *jiráyat* black soil of fair depth, assessed at Re. 0-14-6 per acre. The field grows kharif and rabi *jowári*, *tur*, gram and *bájrí* but in no definite rotation. Season and cultivation are each described as very fair. The field gets manure every alternate year, the application given for the *bájrí* being 50 cart-loads apparently for the field of $5\frac{1}{2}$ acres. The seed was drilled in July at the rate of $8\frac{1}{2}$ lbs. per acre. The crop ripened in the middle of October and yielded 548 lbs. grain and 255 bundles of straw or *kadbi* per acre. This is probably correctly estimated as a 12-anna crop. The gross value of produce comes to Rs. 17-6-7 per acre and the incidence is 5.20 per cent. The experimenter says the village has plenty of grass in the hill lands; therefore, except when fodder is scarce, *bájrí* straw seldom obtains any sale.

Mr. Sale's second experiment on linseed is not satisfactory and is not included in the tabulated statement. It was unquestionably a poor crop.

He says: "The crop looked a good one, but its outturn was disappointing; the *jowári* crop in the same field was certainly a 12-anna crop." The linseed only occupied a small portion of a large number. It is a delicate crop and although the plants may look tolerably well developed, the seed vessels may in some seasons be comparatively empty owing to the effect of rust or extreme cold or from some other cause. It is probable that the crop experimented upon was affected in this way.

The field grows cotton, *jowári*, gram, linseed, *tur* and *kardai*, the two latter probably subordinate to the *jowári*. The season was good and cultivation fair, no manure being applied. 18 lbs. seed sown in October produced a crop which yielded 100 lbs. oil-seed in January which was worth only Rs. 4-8 per acre. The seed-rate is high. The incidence works out 14.12 per cent. The crop is much overestimated at 12 annas if the soil is such as is suitable for linseed and I should doubt its being so.

The experimenter's wheat test (No. 49) was taken on light, friable soil about 18 inches deep which bears an assessment of Re. 1-1-10 per acre. The wheat was irrigated from a well which held a scanty supply of water. The land is chiefly dry-crop and mostly grows *bájrí* and *jowári*. This year there was a small patch of chillies near the well. No manure was given for the wheat. The extent of irrigation is not reported but it is pretty evident from the report that the crop was not an irrigated one in the true sense of the term. Water sufficient to prevent drought was no doubt given. The season was only fair. Rain failed entirely after October.

The outturn comes to 568 lbs. grain and 770 bundles of straw per acre together worth Rs. 20-8. The bundles of straw weighed approximately about 2 lbs. each. The incidence is 5.43 per cent.

Mr. C. S. F. Crofton, Assistant Collector,

Reports one test each on rice, groundnut and wheat.

The rice (Exp. No. 50) was a Mával taluka transplanted crop grown on good black soil assessed at Rs. 2-6-2 per acre. The field grows rice every year. It gets water from a diverted stream. No manure was given to the field but the seed-bed was liberally raked with cowdung, branchwood, leaves, grass, &c. The test area was selected on this raked portion which probably represented more than an average crop for the whole field. The season was on the whole good. The crop estimated at 15 annas yielded 1,593 lbs. grain and 1,600 lbs. straw per acre. The latter is valued high at 1½ cwt. per rupee. The gross value of outturn comes to Rs. 49-4 per acre and the incidence 4.84 per cent. only. The seed-rate is reported at 80 lbs. per acre which is apparently high.

The groundnut test (No. 51) was taken at Khed where the cultivation of the crop is tolerably extensive on medium black soil similar to that of the field of experiment. The groundnut is recognised as a good rotation crop with onions, potatoes, chillies and such other irrigated crops as are grown on this class of soil. The field has the advantage of being irrigated by *pát* from a stream and the assessment is Rs. 2-1-9 per acre for soil and Rs. 4 per acre for water. The season was only middling, there being want of late rain. A moderate dressing of ordinary manure was given in April and the field was liberally cultivated before it was sown. The seed-rate, 80 lbs. per acre, is higher than average. The crop is underestimated at 2 annas. It yielded 960 lbs. nuts and haulms which when green weighed about 4,000 lbs. per acre. The latter, though a useful fodder, is valued high at Rs. 6-14 per acre. The gross valuation of the crop comes to Rs. 29-6 per acre. Mr. Crofton reports that the groundnut crop throughout the district was blighted.

Unirrigated *Potya* wheat (Exp. No. 52) was the subject of this officer's last experiment. The field has no source of irrigation and grows dry crops of wheat, *jowári* and gram. *San* was grown as a green manure before the wheat and ploughed in. This is a good preparation. The late rains were scant and the crop was poor. 90 lbs. of seed, a high seed-rate, drilled in October only produced in February 320 lbs. grain and 270 lbs. straw together worth Rs. 13-9-4 per acre. The crop is classed locally as a 10-anna one, but is overestimated.

Shola'pur.

Mr. Chuckerbutty, Assistant Collector, carried out two experiments, one on rice and another on groundnut in his charge, but reports that owing to pressure of plague and other work he could not gather the necessary additional information required and therefore has not submitted the results. Mr. Bengiri took tests on groundnut, linseed and sugarcane crops as directed.

Mr. Wilkins, Superintendent of Land Records and Agriculture, C. D., conducted his fourth and last experiment on groundnut in this district.

Mr. R. P. Bengiri, District Deputy Collector, Sholápur,

Submits three experiments, one each on groundnut, linseed and sugarcane.

The groundnut (Exp. No. 53) was a poor crop and this appears to have been at least partly due to blight induced by misty weather in November. The soil of the field is light and bears an assessment of Re. 1-1-9 per acre. There is a well in the field which is reported to be capable of irrigating 7 acres 12 gunthas, the area of the whole number being 11 acres 28 gunthas. In the years 1895-96 and 1897-98 *jowári* was grown in the field and it is probable that for a properly irrigated crop the capabilities of the well are much less than those reported. Groundnut in an ordinary season does not require much irrigation, one or two waterings after the rains cease is sufficient to bring it to maturity. There was failure of the earlier rains to some extent and probably a larger extent of irrigation than in a good season was required. Irrigation during the monsoon season for any crop is not so beneficial as natural rainfall. The field was manured with ordinary manure at the rate of 10 carts per acre. Tillage is described as good but is not particularized. The seed-rate is reported at 84 lbs. per acre. This is high. The experimenter says the seed was broadcasted. This is very doubtful unless the broadcasting consisted in dropping the seed by hand in the furrow behind a plough and covering by the soil moved in making the next furrow. This is a common and successful method of sowing groundnut. The outturn classed as an 8 anna crop comes to 688 lbs. nuts and 2,461 lbs. useful by-product together valued at Rs. 44-6 per acre. The nuts are valued at nearly 17 lbs. per rupee, a high rate as wholesale prices go.

The linseed experiment (not included in tabular statement) was made on a black soil field assessed at Re. 0-12-2 per acre. It grew the same crop in 1895-96, was fallow in the famine year 1896-97 and grew *jowári* in 1897-98. No manure was given. The crop is estimated at 7 annas and like all the other linseed crops tested this year in the Central Division was poor. The experimenter says there was not sufficient rain at sowing time. Subsequently the rain that was needed did not come. In December the crop got reddish on account of a disease called *támbera* and was probably the cause of all the poor results from linseed tests reported this year. This disease was rust and as already described the effect is that the pods or fruit vessels are mostly empty. The outturn is only 95 lbs. seed per acre valued at Rs. 3-5. The incidence 22-99 per cent. is naturally high.

The sugarcane test (No. 54) was taken on mixed black soil. The portion which was under well irrigation at revision survey only bears an assessment of Re. 0-7-8 per acre and that portion which had then dry crop only about 4 annas per acre. A second well has been constructed since revision settlement, and it would almost appear that the whole number is capable of growing irrigated crops in years of specially favourable rainfall. The whole area is 20 acres 23 gunthas, of which 13 acres 10 gunthas is classed as *jiráyat*. In 1895-96 the crops grown were onions, *brinjals*, carrots and groundnut. All these in an average season would require a certain amount of irrigation and onions would require full irrigation in the fair season. In 1896-97 the crops were *jowári* and maize. In 1897-98 groundnut and chillies were grown.

The cultivation of the sugarcane is described as good. A heavy dressing of sheep and goat manure mixed with ordinary village manure was given and sheep were penned on the land during January and February. The crop was planted in April and ripened in 12 months. Rain was scanty early in the season and the failure of rain in November is also said to have injuriously affected

the crop. Two months after planting the crop suffered from grubs or caterpillars, and these are said to have been promptly destroyed by powdered *karanj* (*Pongamia glabra*) cake given with the irrigation water. The outturn per acre comes to

				Rs.	a.	p.
<i>Gul</i>	...	...	...	258	13	8
Seed tops for sets	...	...	...	30	0	0
				288	13	8

The other by-products may be neglected as being necessary for feeding work cattle and for fuel during the cane-crushing and *gul*-making processes. The *gul* is priced at 18 lbs. per rupee or an ordinary rate when markets are fairly well stocked. The variety grown was the Poona *Pundia*.

Mr. W. D. Wilkins, Superintendent, Land Records and Agriculture, C. D.,

Reports a test (No. 55) on irrigated groundnut from this district. The whole number is fairly large, *viz.*, 7 acres 16 gunthas, and the soil varies as is common in the Deccan. The groundnut occupied 35 gunthas only and the soil of this patch is called black, but would probably be more correctly described as medium black as the rest of the number or a portion of it has soil of still lighter description. Since revision settlement a well has been made at a reported cost of Rs. 800. This irrigates 4 acres of the field. Probably this is the best part of the number and no doubt includes the groundnut area. The rotation is undefined, but it is probable that *jowari* with safflower and sesamum and perhaps gram have been grown on the dry-crop area since 1895; whilst on the area which can be irrigated wheat, maize, chillies and gram have probably been grown as irrigated crops or as crops helped by irrigation.

I do not attach much importance to Mr. Wilkins' groundnut test. In the first place the crop was very poor. He reports that 40 people including children harvested the crop on the test area in about 3 hours, or in one-third of a working day. The test area was one-tenth of an acre and its outturn was valued at Re. 1-9-6. This amount was hardly sufficient to pay the labourers employed in digging and gathering at 2 annas each per day. The experimenter reports that it is usual to pay for the work by giving one-eighth of the produce. At this rate the labourers employed would have earned about one-fourth anna each per day. It is evident that from some cause or causes which the experimenter has failed to report the crop was practically a failure. The cultivator must have expected better results. It is reported that the land is annually ploughed with a heavy plough drawn by 8 or 10 bullocks, that for the tested crop 23 cart-loads per acre of cowdung ashes, &c., were given, and that 103 lbs. of shelled nuts, double the necessary seed-rate, were drilled seasonably in June. The crop was twice hand-weeded with the *khurpa*. The rainfall was deficient and 6 waterings were given; the well held sufficient water. The produce was dug up in December and was worth only Rs. 15-14-9 per acre.

The occupant purchased the number, 7 acres 16 gunthas, for Rs. 60, the assessment being Rs. 6. In 1896 he constructed the well already referred to and got Rs. 200 from Government as *tagdi* to enable him to do so. He is not otherwise in debt. His household consists of wife and 5 children, boys and girls, and a child daughter-in-law. He owns one-sixth part of another survey number assessed at Rs. 11 and pays as tenant Rs. 35 for a third survey number, the extent of which is not reported.

Sa'ta'ra.

Mr. Percival was ordered to take two tests on rice and one on *ragi*, and Mr. Palmer one each on rice, *bajri* and *ragi*. They followed the programme and did additional tests on wheat and *ragi*. Mr. Heblkar was directed to experiment on *bajri* and linseed. He reports that he was engaged on audit duty when *bajri* crops were being harvested and later on he could not find linseed fields suitable for test. He should have with the Collector's permission carried out tests on some other crops instead.

Mr. P. E. Percival, Assistant Collector,

Reports four tests, one on *nágli*, two on rice and one on wheat.

56. A lato ripening variety of *nágli* (Exp. No. 56) was the subject of the first experiment. The field has red rocky soil and bears an assessment of Re. 0-11-3 per acre. The experimenter says the field is rather barren and is situate in terraced hilly country. The field was selected by the Mámíatdár of Jávli. The experimenter says: "As most of the *nágli* crops had been reaped and the late *nágli* crops which were standing had suffered from want of October rain, this crop was below the average, being about an 8-anna crop." Mr. Percival throughout his reports discusses the relative burden of assessment in various parts of his charge and he points to the results of his experiments to substantiate his remarks. If he wished such results to carry conviction, he should have himself chosen his fields after careful general personal inspection and not begun with a field which grew a crop admittedly under average for the village.

The field during the past four years grew two crops of groundnut and one each of *sáva* (*Panicum miliare*) and *nágli*. The groundnut is reported to be more remunerative than the other crops. The owner of the field is unusually well-to-do. He employs Mahárs to do his agricultural work. He is intelligent and Mr. Percival concludes that his cultivation is probably better than that of his poorer neighbours. This may or may not be so. The field grew a second crop of *pártu* (*Dolichos lablab*) after the *nágli*. A portion of the survey number is irrigable from a channel but not that portion in which the experiment was made. The second crop was probably only grown in the portion commanded by the *pát* water. The tested crop was grown from transplanted seedlings which were raised in a rábed seed-bed. The field was manured with 6 carts per acre of cattle manure. The tillage was fairly good. The seed-rate works out 10 lbs. per acre. The outturn comes to 526 lbs. grain per acre worth with straw Rs. 17-2-3. The incidence is 4·10 per cent. This may be considered a very moderate figure considering all the circumstances related above.

57. This officer's second experiment (No. 57) was on rice. Again the field was selected by the Mámíatdár of Jávli. The experimenter reports that the test area selected was rather above the average of the whole plot of rice and also of other lands of the village. "The village however is a poor somewhat hilly village, so that most of the crops there are not good. The field lies close to the village and some of the refuse of the village is thrown into it which accounts for the crop being somewhat better than the surrounding crop." The field has red soil. It grows the same crop annually. The assessment is Rs. 7-4-8 per acre. The field is partly classed as rice land partly as *jiráyat*. The tested crop was irrigated for a fortnight when the rain failed from a small stream. No special water-rate is charged. The cultivation was careful. The crop was grown from transplanted seedlings which were raised in a rábed seed-bed. The crop ripened in November and yielded 1,262 lbs. grain and 1,472 lbs. straw per acre, together worth Rs. 41-4. The incidence comes to 17·67 per cent. The experimenter did not actually test the dryage of the grain. He estimates the shrinkage at one-sixteenth and makes this allowance approximately in calculating the acre outturn. Mr. Percival says that the experiment shows that the assessment is high considering that the land in question is not rich land. "The assessment however is more felt in the very poor villages in the Koyna Valley, for though the assessment is low there, the margin of profit is not enough to cover it. The custom in that neighbourhood and in fact in other parts too is to live on the crop and pay the assessment from the money brought back from Bombay by the male members who go there for employment in the fair season. As the people are naturally poor they complain more about the assessment than the wealthy cultivators in the eastern tálukas." Mr. Percival believes that the burden of assessment is higher in the Jávli táluka especially in the western villages than in the eastern tálukas. In these western Jávli villages he says the people at the present time after several bad seasons are willing to give up part of their lands to the Forest Department at 15 times the assessment.

58. The third experiment (No. 58) was also on rice. The Mámíatdár of Vái selected the field. The whole number is 4 acres 15 gunthas in extent. One acre is classed as rice and bears an assessment of Rs. 7-12 per acre. The

remainder classed as *jirayat* bears an assessment of approximately 6 annas per acre. The rice area is described as "marshy land." It does not appear whether this is an advantageous quality. I suspect it is. The rainfall was good; tillage fairly good and the crop estimated locally as a 10-anna one. The field got no manure but the seed-bed in which the seedlings were raised was liberally raked with cowdung, branchwood and grass. The crop ripened in November and yielded 1,131 lbs. grain and 1,460 lbs. straw together worth Rs. 36.9. The incidence comes to 21.19 per cent.

Mr. Percival says the field was similar, presumably as regards crop, to most of the rice fields in the hilly villages of the neighbourhood. The land is terraced in a situation "where rain water remains for a long time." It belongs to a Kunbi family who themselves did the whole cultivation.

The experimenter writes as follows:—

"This experiment is, I think, the most trustworthy of the three now submitted because it was a properly typical field and the details were more carefully carried out than in the second experiment. It seems to show that the assessment on rice in that neighbourhood is rather high. Where the land is well watered wheat is often grown as a second crop after the rice. This however could not be done in the case of the land under experiment."

The fourth experiment (No. 59) was on spelt or *Khapli* wheat, a second crop after rice. The wheat was irrigated from a *pát*. Two acres of the field are classed as *bágayat* and assessed at Rs. 2 per acre; 3 acres and 31 gunthas are *jirayat* and 22 gunthas rice land, the assessment on the latter being Rs. 3-10-2 per acre. There is a special water-rate of Rs. 5 on the whole field. The occupant has recently partly constructed a well, the water from which is available but the building is not complete. Second crops of wheat after rice have been taken in each of the last three years. Sheep were penned on the land during April and May. The rice crop got the benefit of this manure and possibly the wheat crop was to some extent benefited.

I gather from the report that the intention of the experimenter was to test a wheat crop on rice land which under favourable conditions of season can grow a second crop of wheat. The report shows that a good unirrigated wheat crop need not be expected except perhaps once in three years and the second crop is not sown unless there is favourable late rain. The season was unfavourable and unirrigated wheat crops were poor. The experimenter thinks that his field grew a crop which might be considered a good non-irrigated crop in a favourable season and calculates that one-third of the outturn, as determined by his test, represents the return which is ordinarily got from second crops of wheat taking one season with another. This is mere speculation. The facilities for irrigation in the field in question are considerable and if the occupant manured his second crop with fair liberality he ought to get a much better outturn than that reported. The crop is estimated at 16 annas. If this is a correct estimate the sooner the cultivator stops growing wheat as a second crop the better. The gross outturn is only valued at Rs. 21-5-10 per acre, the outturn of grain being 669 lbs. grain per acre. The reported seed-rate, 165 lbs. per acre, must be wrong. The yield would be satisfactory for a dry crop but would barely pay the cost of irrigation if the water was raised from a well. It is only well-manured liberally managed irrigated crops that do pay. The land is cultivated by a retired schoolmaster and he is said to cultivate the land in a skilful manner by hired labour. He bought it recently from a Marátha who had to sell this portion of his lands in order to pay his debts. Mr. Percival may be right in his contention that the burden of assessment is unequal in various parts of his charge and may in some parts press heavily, but his experiments as submitted by no means prove in any reliable way that such is the case.

Mr. C. E. Palmer, Assistant Collector,

Forwards four experiments, one on rice, one on *bájrí* and two on *nágli*.

The rice test (No. 60) was taken on a field which is assessed partly as rice land, partly as *jirayat*. The assessment on the rice portion is Re. 1-10-5 per acre. The soil is brown and grows rice every year and a second crop of wheat in

seasons of favourable late rainfall. The experimenter reports that 2 acres 23 gunthas are classed as rice land but only $1\frac{1}{2}$ acres are irrigable, the water being got from a *nāla*. There is no special water-rate and if the facts are correctly reported the occupant is very leniently dealt with as regards assessment. The crop was grown from transplanted seedlings and as usual the seed-bed was rābed. The field also was manured at the rate of 15 cart-loads ordinary manure per acre. The reported seed-rate, 182 lbs. per acre, is much over average and must be wrong. The crop yielded 1,670 lbs. grain and 3,405 lbs. straw per acre together worth Rs. 39-8. The straw is valued low at only Rs. 2-8 per acre. The crop was locally estimated at the average standard. The incidence comes to only 4.18 per cent.

I cannot report Mr. Palmer's *bājri* experiment. He had to stay in Sātāra until the 2nd November and *bājri* crops were ready some days earlier. He directed the Māmlatdār of Karād to select a crop. The Māmlatdār did so, measured out the test area and reaped the crop. The crop was even, it is reported, and was estimated as an average one. It is reported that 4 rows of *bājri* were grown alternately with one row of *tur*. I have never seen a five-coulter drill in the Presidency and I do not know how four rows of *bājri* and one row of *tur* could be sown evenly without a five-coulter drill. It is more likely that every fourth row was a mixed row of *bājri* and *tur* or of *tur* alone. The point is immaterial as the *tur* was not tested. The test area was 10 gunthas and I assume that the *bājri* occupied the whole of this, although the experimenter says it only occupied 8 gunthas, and had *tur* as a subordinate crop. The field grows this mixed crop apparently in every alternate year, and is rotated with *jowāri* and *kardai* (safflower). The rainfall is reported as sufficient and timely and the field was cultivated with fair liberality. The revision assessment is Rs. 2-9-7 per acre. The *bājri* outturn was only worth Rs. 7-4-4 per acre. Either the true circumstances regarding the productive capacity of this field are incorrectly reported or the assessment is uncommonly high. The reported weight of *bājri* straw comes to only 240 lbs. per acre. The crop therefore was a thin poor crop and certainly not an average as reported. It is stated that 67 lbs. seed per acre was sown. This amount exceeds $\frac{1}{3}$ of the outturn and is quite eleven times as much as was actually required.

Mr. Palmer's third test (No. 61) was on *nāchni*. The crop was one of two left standing in the village. It occupied only 5 gunthas and the other was a patch of two gunthas. The test area, four gunthas, is half that prescribed by standing orders. Mr. Palmer reports that the crop was rather better than other *nāchni* crops he had seen further west in the tāluka. The crops taken in the three previous years were (1) *sāva* and *tur*; (2) groundnut; (3) *nāgli*. The crop was grown from transplanted seedlings. The field has reddish brown soil which bears an assessment of Re. 0-14-1 per acre. A dressing of 30 cart-loads per acre of manure was given. October rain was deficient. The cultivation is described as indifferent. The outturn which comes to 485 lbs. grain and 980 lbs. straw per acre, together worth Rs. 13-12, is much overestimated at the 16-anna standard. The incidence is 6.40 per cent.

The second *nāchni* experiment (No. 62) was made on a black soil field assessed at Rs. 2-1-9 per acre. It gets manure every third year, the application being about 8 cart-loads per acre. No manure was applied for the tested crop. Mr. Palmer reports that the crop was distinctly above the average of those he had seen during the preceding month. The owner estimated it as a 12-anna crop, the other villagers at 16 annas, and the latter is the valuation given. The crops grown in the three previous years were (1) *nāchni*, (2) late *jowāri* and *udid*, (3) *kharif jowāri*. The tillage is described as good but the season was only middling, the late rains being deficient. The outturn comes to 766 lbs. grain, 1,300 lbs. straw, and this, notwithstanding the anna-valuation given, may be classed as a very middling crop. The gross value comes to Rs. 18-6-5 per acre and the incidence 11.46 per cent.

SOUTHERN DIVISION.

Belgaum.

On account of heavy plague work none of the officers in this district were able to conduct any experiments this year. Mr. J. L. Lushington, Superintendent, Land Records and Agriculture, S. D., was also placed on plague duty in this district and consequently paid no attention to this work.

Bijapur.

The Assistant Collector in charge Bijapur sub-division did not conduct any experiments and no explanation has been received. Messrs. Cama and Kelkar carried out one test each on rabi *jowári*, linseed and wheat. The former could not test kharif *jowári* and gram owing to exigencies of other work. Mr. Kelkar omitted to take tests on kharif *jowári* and *bájrí* owing to his being on plague duty early in the season and later on owing partly to his illness and partly to his inability to find a suitable crop. The Collector considers the explanations of both these officers as unsatisfactory.

Mr. A. K. Cama, Assistant Collector,

Submits three experiments, one each on linseed, late *jowári* and irrigated wheat. The reports are full and clear.

Linseed (Exp. No. 63) was tested on black soil which in different portions grows kharif as well as rabi crops annually. *Jowári* and *bájrí* with subordinate mixtures are grown as monsoon crops, but in ordinary seasons the greater portion of the holding is reserved for rabi crops and these consist mostly of late *jowári*, safflower, gram and linseed. In the famine year 1896-97 the field lay fallow and in the following year $6\frac{1}{2}$ acres out of 17 acres 32 gunthas were also fallow. No manure is ever applied. The rainfall was favourable but north-east wind which blew in November is reported as having injured the crop. The tillage as described may be called moderately good. The outturn comes to 250 lbs. oil-seed per acre valued with the by-product at Rs. 12-1-5 per acre. The field bears an assessment of Re. 0-15-3 per acre and the incidence is 7.88 per cent. The crop was locally estimated at 7 annas.

Rabi *jowári* (No. 64) was tested also on black soil assessed at Re. 0-15-3 per acre. The field was fallow in 1896-97, the famine year, but ordinarily grows cotton and rabi *jowári* with smaller areas of safflower, linseed, wheat, &c. The season was fairly favourable but the cultivation is described as indifferent. The experimenter's notes however show that the field was prepared for sowing with probably average care. It was four times harrowed before and during the monsoon season. After sowing the crop was intercultured with a bullock hoe and hand-weeded with the *khurpi*. The outturn represents that of a very fair late *jowári* crop. The yield was 599 lbs. grain and 1,875 lbs. *kadbi* per acre together worth Rs. 13-12-3. The grain is however valued at the very cheap rate of $59\frac{1}{4}$ lbs. per rupee. The incidence is 6.92 per cent. The local anna valuation is only 7 annas. This I believe to be an underestimate.

The wheat tested by Mr. Cama (Exp. No. 65) was grown as an irrigated crop on a black soil field which is partly classed as *bágáyat* and partly as dry-crop. There is a well in the centre of the field which was constructed before revision settlement. The *bágáyat* assessment is only Re. 1-0-10 per acre. The number is close to the village site and accordingly benefits by the droppings of cattle. No manure was given for the wheat which was a second crop after Italian millet. The occupant explained that his well did not hold much water and if he manured the soil for the wheat the crop would need more water than he could get from the well to bring it to maturity. In the *bágáyat* portion such crops as *brinjals*, chillies, tobacco, castor-oil plant, barley, wheat, carrots, maize, &c., are grown in undefined rotation.

The wheat yielded excellently, the grain produce being 1,630 lbs. worth Rs. 41-13-11. Rats are reported to have done harm in this and other fields.

The crop is, I believe, underestimated at 9 annas. The incidence is only 2·51 per cent.

Mr. V. R. Kelkar, District Deputy Collector,

Reports three experiments, one each on wheat, rabi *jowári* and linseed.

The wheat experiment (No. 66) was taken on black dry-crop land which is assessed at Re. 1-1 per acre. The Krishna, when exceptionally high, floods the field. This only happens in occasional years. Every sixth row was wheat and safflower mixed. The field grows rabi *jowári*, wheat, gram and cotton, the three former crops having as usual safflower subordinate to them. The season was favourable and tillage is described as good. The field gets manure every third year and the tested crop is reported as having been manured with 18 cart-loads per acre.

Mr. Kelkar tested *jowári* (No. 67) on another black soil field which is assessed at Re. 0-15-5 per acre. The field was fallow in 1896-97, the famine year. Kharif *jowári* was grown in 1897-98 with subordinate pulses, &c. In the year of experiment the greater portion of the field grew rabi *jowári* with linseed in every eighth row. Safflower occupied the headlands. The field gets manure every fourth year; 19 cart-loads of ordinary manure per acre were applied for the tested crop. The occupant has 16 work cattle and therefore a good deal of manure accumulates, but he believes that in years of irregular rainfall manure injures the crop and applies it less frequently than he would do if the rainfall was more dependable.

The linseed field (Exp. No. 68) has also black soil, the assessment being Re. 0-11-4 per acre. Part of the number was fallow in the famine year 1896-97, part grew *jowári*, which however withered. In 1897-98 the crops were rabi *jowári* and wheat with subordinate safflower. No manure has been applied for 10 years. The linseed crop was poor. The season is described as slightly unfavourable.

The outturn results of Mr. Kelkar's experiments are tabulated as under :—

Crop.	Anna-Estimate.	OUTTURN PER ACRE.		Value of outturn.	Assessment per Acre.	Incidence of Assessment.
		Principal Product.	By-product.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.
Wheat (Exp. No. 66) ...	14	645	980	18 10 9	1 1 0	5·77
<i>Jowári</i> (Exp. No. 67) ...	10	849	1,526	18 5 3	0 15 5	5·26
Linseed (Exp. No. 68) ...	6	142	317	5 4 3	0 11 4	13·45

The anna estimates are probably very near the mark. The wheat, *jowári* and linseed are valued at $34\frac{4}{5}$, $53\frac{1}{2}$ and $26\frac{1}{2}$ lbs. respectively per rupee. These are cheap rates as compared with prices obtainable in some districts in average years.

The linseed field is *Ját indm*. It and an adjoining number are rented for a term of ten years by the cultivator. The respective areas and revenue assessments are as under :—

			Assessment.	
			A. g.	Rs.
Linseed field ...	...	...	12 26	9
Adjoining number ...	...	...	16 25	13
			<u>29 11</u>	<u>22</u>

Mr. Kelkar reports that the rent paid for the two numbers is Rs. 112-8 per annum. The *Inámdár* pays the *judi* on the assessment.

Dha'rwa'r.

None of the officers in this district were able to do crop experiments this year owing to pressure of work in connection with the plague.

Kola'ba.

Mr. Thakár, District Deputy Collector, held charge of both the sub-divisions of this district from the commencement of the season till the middle of February and owing to stress of plague and other work no crop experiments have been made by him.

Batna'giri.

Two experiments on sesamum, one on *kodra* and one on *rági*, were directed to be made in the three sub-divisions. Mr. Mádgaonkar took tests on *rági* and *kodra* but the sesamum was all cut before he started on tour. He intended to do two tests in the Khed taluka but the crops there were all cut earlier than usual owing to anticipated damage by locusts. Mr. Deval carried out the programme in his sub-division as well as did one test in the other sub-division, of which he held charge in addition to his own.

Mr. G. D. Mádgaonkar, Assistant Collector,

Submits two tests, one on *nágli*, the other on *harik*.

The test area in the *nágli* field was 5 gunthas only and therefore below the prescribed minimum for dry crops. The field (Exp. No. 69) is assessed at Re. 1-2-6 per acre. It adjoins a creek and is classed as *rabi*. The land is not rested or fallowed for a term of years like ordinary *varkas*. *Nágli*, *harik* and *vari* are rotated together. The tested crop was grown from transplanted seedlings. The seed-bed was rábed with cowdung, branchwood, grass and *harik* straw. The whole field was apparently neither manured nor rábed. The seed-rate, 11½ lbs. per acre, is considerably over average. The season was good but the tillage is described as indifferent. The crop yielded 597 lbs. grain and 960 lbs. straw per acre together worth Rs. 20-2-8. The straw is rated very high. The incidence comes to 5.73 per cent. The experimenter expresses a belief that the crop for the particular field considering that the rainfall was seasonable and sufficient was above normal but not up to the average of such *varkas* lands as have tolerably good soil and are regularly fallowed for a term of three years or longer.

The *harik* test (No. 70) was taken on fairly level *varkas* land assessed at Re. 0-3-6 per acre and which, after four years' fallow, grew in succession *nágli*, *vari*, *harik* and *til*. The season was quite satisfactory. No manure was given. The cultivation is described as good and the crop is estimated at the maximum 16-anna standard. 30 lbs. of seed, a high seed-rate, sown broadcast in June produced a crop which ripened in November and yielded 656 lbs. grain and 780 lbs. straw, the gross value being Rs. 9-15-1 per acre. The incidence works out 2.2 per cent.

Mr. K. B. Deval, District Deputy Collector,

Submits five experiments, two on sesamum, two on *harik* and one on *nágli*.

Mr. Deval's first sesamum test is not satisfactory. The land is undulating, rocky *varkas* assessed at 2 annas per acre. The number was fallow for five years before 1895. The crops grown since were (1) *nágli*, (2) *harik* and (3) *vari* and then the crop of experiment. The reported seed-rate is 9 lbs. per acre. The reported outturn is 19 lbs. 34 *tolas* per acre. The land is Khoti and the Khot takes ⅓rd the outturn. Deducting the seed-rate and the Khot's share from the outturn, the tenant is left with something over 4 lbs. per acre of the oil-seed. The crop is estimated as an 8-anna one. The rainfall was seasonable and good. I cannot include the results of this experiment in the tabulated statement of the report.

Mr. Deval's second experiment (No. 71) on sesamum is more satisfactory. The field in this case is good *varkas* with no stones. The assessment is Re. 0-2-10 per acre. The field was waste for five years before 1895 and has grown since (1) *vxri*, (2) *harik* and (3) *barag*.

The sesamum only occupied a small patch of the whole number. The owner of the number has protected the field from surface waste by erecting a wall or *bándh* of stones. The owner has sublet the land to the cultivator. The terms ought to have been reported. No manure was given but the season was very favourable and cultivation is described as good. The outturn, which is

classed as a 12-anna crop, comes to 147 lbs. of the oil-seed worth Rs. 10-8-6 per acre. The incidence is 1·68 per cent.

Mr. Deval's third experiment (No. 72) is on *nágli*. This was the first crop taken after five years' fallow. The experimenter describes the land as first class *varkas*. Excluding *pót kharáb* the whole number measures $18\frac{3}{4}$ acres. The assessment on this area is Re. 0-3-5 per acre. In the year of experiment the crops sown were :—

<i>Nágli</i> with sprinkling of <i>vari</i> ...	...	...	A.	g.
<i>Harik</i> ...	...	...	7	20
Sesamum ...	...	...	4	0
			0	20
			12	0
Grass or fallow or waste ...	...	...	6	31
			18	31

The land is sublet by a Khot to a cultivator. The terms of occupation, if correctly reported, are peculiar. The Khot takes one-third of the produce; the remaining two-thirds are equally divided between him and the cultivator, "and the labour is supplied by both". The assessment is paid by the Khot. The experimenter ought to have reported the terms of tenure more definitely; particularly as to who supplies the seed, manure and ráb material. The crop as usual was grown from transplanted seedlings which were raised in a rábed seed-bed. The reported seed-rate, 29 lbs. per acre, and the area of seed-bed per acre of transplantation, 13 gunthas, must each be wrong, being much over average. The per acre outturn was 685 lbs. *nágli* grain and 718 lbs. straw and 66 lbs. of *vari* grain together worth Rs. 21-12-1. The incidence works out 0·97 per cent.

This officer's first *harik* test (No. 73) was taken on *varkas* land which bears an assessment of Re. 0-4-11 per acre, and which after 6 years' fallow grows *nágli*, *vari*, *harik* and sesamum in the order named. The land is rented by the cultivator from a Khot. The latter pays the assessment and takes one-third the produce. As usual no manure was given for the *harik*. Season and cultivation are each described as good. The crop yielded 759 lbs. grain worth Rs. 11-0-3 per acre. The incidence comes to 2·79 per cent.

The second *harik* experiment was taken on what the experimenter calls "middle class *varkas*", but which bears an assessment of 7 annas per acre. Mr. Deval says: "The soil is very soft and red. It is very good for fruit trees such as jack and mangoes, but it is not good for crops." This description is very sketchy and very unsatisfactory and the experiment is not included in the tabulated statement. I can only suppose that the soil is bad for crops because shaded by fruit trees. The experimenter says: "I selected the field which represented a fair average crop of the season." The season was good and the outturn certainly does not represent an average crop for *varkas* lands assessed as high as 7 annas per acre. The tested crop was the first taken after 7 years' fallow. Three crops are taken after this term of fallow, *harik*, *vari* and sesamum. The outturn only comes to 244 lbs. per acre, about 7 times the reported seed-rate. The gross value of produce is only Rs. 3-8-8 per acre, and the incidence comes to 12·50 per cent., a very high figure indeed for *varkas* land. I believe however that there are circumstances connected with the tenure of this land which are not disclosed in the report.

Kánara.

Experiments on rice, sugarcane and *rági* were asked for from this district. Mr. Baker did only one experiment on rice. He could not do more tests as he was for some time in charge of the treasury and later on on plague duty at Haliyál. Mr. Yennemadi did one test on rice and Mr. Joshi, who took charge from him, one on sugarcane. The latter officer intended to take a test on late rice but was prevented from doing so owing to exigencies of the season and pressure of other work.

Mr. W. T. W. Baker, Assistant Collector,

Submits one experiment (No. 74) on drilled rice. The field is situate by the side of a main road and in close proximity to the market town of Mundgod. The

field is fairly large, 8 acres 4 gunthas, and the greater portion, 7 acres 32 gunthas, is assessed as rice land. The occupant grew sugarcane two years ago but owing to scarcity of labour has not grown this crop since. The field is irrigable from a tank, some distance away; but water is only taken when rain fails and no special water-rate is charged. No second crops are grown. Manure can be bought from *Gaolis* at 6 annas per cart-load. The occupant bought 20 loads for his fields, and of this and of home-made manure 8 cart-loads per acre were given. The reported seed-rate is 95 lbs. per acre. The outturn comes to 2,246 lbs. grain and 2,974 lbs. straw per acre. This was locally estimated as a 10-anna crop; but for ordinary rice land the estimate is low. The field being near a populous centre may benefit manurially in the usual way and may in consequence be capable of growing much better crops than average. Fields that are beside public roads in close proximity to towns should not for obvious reasons be selected for crop experiments. The straw is valued at $2\frac{1}{4}$ cwts. per rupee which is unusually high. The gross value of outturn comes to Rs. 46-13-3 per acre. Half the number, not the portion experimented upon, is sublet by the Khatedár under *palu* tenure. Under this system the produce is shared half and half by superior holder and tenant. The former supplies work cattle, pays half the assessment and supplies half the seed. The tenant does the rest. Nothing is said regarding who supplies the manure.

Mr. V. D. Yennemadi, District Deputy Collector,

Submits a test (No. 75) on broadcasted rice. The crop was grown on light soil, *reval*, as distinguished from *chiklot* or clayey soil. The assessment is Rs. 5-5-8 per acre. There is no artificial means of irrigation. In seasons of favourable late rainfall a hot weather crop is grown and it may be assumed that the field is therefore favourably placed for the retention of rainfall and moisture. The number is 1 acre 31 gunthas in extent. It is sublet by the registered owner, the rent as stated by the experimenter being 18 *khandis* of paddy worth Rs. 36 in the year of report or nearly 4 times the assessment. The terms of lease are not however clearly stated. The field was liberally manured and carefully cultivated. The manure used consisted of leaves and forest litter which were used as litter under cattle in the first instance and afterwards stored in a manure pit with the dung and urine of the cattle. The seed, 144 lbs. per acre, was broadcasted in June. The crop ripened in the middle of October and produced 2,320 lbs. grain and 3,630 lbs. straw together worth Rs. 53-2 per acre. These figures represent an excellent outturn for a broadcasted crop. The incidence works out 10.07 per cent.

Mr. K. P. Joshi, District Deputy Collector,

Forwards one test (No. 76) on sugarcane. He has submitted a concise, carefully written report from which such information as is important can be easily gathered. He makes it clear that the season was specially favourable for sugarcane. He describes the crops as luxuriant in the village where the test was taken and in surrounding villages. The rain, which in Kánara usually begins early, continued until the beginning of November and the experimenter is right in concluding that this circumstance was specially favourable. Artificial irrigation during the monsoon season is all very well, but natural rainfall, if sufficient, and not superabundant gives in the case of all crops much better results. The field has yellow clayey soil which the experimenter rightly suggests is retentive of moisture and of manure. It is classed as *tari* or rice land and grows rice in alternate years with sugarcane. The assessment (original survey) is Rs. 4-8-8 per acre. There is no special water-rate, but the number is irrigated from a small tank, about 100 yards distant from the field from which the water is raised by counterpoise lever and bucket lift worked by hand. This method of raising water is common in the district and is both cheap and effective when the depth of water is not considerable. The sugarcane area before plantation was raked or burnt with cowdung, grass and leaves. It is difficult to state definitely what special beneficent action this has but we may conclude with certainty that in tracts of heavy rainfall it is decidedly advantageous. The chief advantageous effect appears to be that the burning purifies the soil and kills the seeds of weeds. The soil therefore becomes fresh and pure and is capable with the assistance of manure of producing a healthy and vigorous crop. After plantation the sugarcane was directly

manured with a top dressing of green leaves, cowdung, &c., and then earth was heaped round the young shoots. The experimenter gives quantities of manure in head-loads but of course the figures are indefinite. At the same time the fact is clear that the field was liberally manured and that in a specially favourable season the method of cultivation adopted produced a good crop. I cannot follow with certainty the experimenter's description of the cultivation. He says the ground was dug a foot deep. I conclude this was done by hand and the work was therefore expensive costing certainly not less than Rs. 25 per acre at ordinary hiring wages for labourers. The land appears to have been ridged up and the sets were planted in the furrows. Only seed tops, that is, the top ends of cane, each with three or four nodes, were planted. There is perhaps economy in planting these seed tops rather than ordinary sets which consist of sections of cane each with three nodes and which if crushed would yield juice which when boiled would produce a high percentage of good *gul*. The seed tops contain juice which is watery and contains much less sugar than the more matured parts of the cane. American experiments have proved that seed tops will produce as satisfactory a crop as ordinary sets. Experiments in India up to date are not so convincing in respect of the same conclusion.

Mr. Joshi had the cane crushed with an iron three-roller mill. Unfortunately these are not so common in the Kánara district as they ought to be. The time-honoured mill with wooden rollers is still there very much in evidence.

The effectiveness of the iron roller mill is shown by the following figures which compare not unfavourably with those of real good work :—

Percentage of juice to cane 66·2.

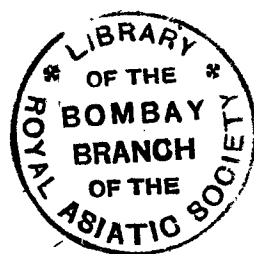
Do. of *gul* to cane 12·9.

The marketable produce is described as liquid *jágrí* and therefore was not boiled to complete solidification. Its price was 22½ lbs. per rupee which for solid *gul* was a very cheap rate. The crop yielded of this liquid *gul* 9,309 lbs. per acre; also 24,080 seed tops which are valued at the high rate of Rs. 4 per 1,000. The seed-rate is reported as 10,000 seed tops per acre. This, I think, is an underestimate; 18,000 would be nearer the mark. This crop however not only yielded valuable per acre outturn of *gul* but also sufficient seed tops per acre to more than replant an equal area of new cane. The gross value as reported comes to Rs. 508·6 per acre and the incidence to 0·89 per cent. The crop took over 11 months to reach maturity.

J. W. MOLLISON,
Deputy Director of Agriculture.

December 1900.

TABULAR SUMMARIES.



Summary of Crop Experiment Reports,

O. S.=Original Survey;

No.	District, Taluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formulae.	AVERAGE PER ACRE.					
					Seed.	Yield of		Total Value of Produce.	Assessment excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.
						Principal Product.	By-Product.			
1	2	3	4	5	6	7	8	9	10	11
AHMADABAD.			Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.
<i>Mr. P. J. Mead, Assistant Collector.</i>										
1	Daskroi (Bágpardosh) ...	Great millet (Utávali Jowár), 31st October 1898.	16	1,320	89	714	850 bundles.	32 2 5	3 14 3 R. S.	12.09
2	Prántij (Demái) ...	Wheat (Vájia), 22nd February 1899.	16	1,900	123	1,290	...	49 1 11	1 13 1 R. S.	3.70
3	Daskroi (Dáni Limda) ...	Gram (Pila Chana), 29th March 1899.	16	900	52	905	...	24 13 1	8 4 1 R. S.	33.27
<i>Mr. A. E. L. Emmanuel, Assistant Collector.</i>										
4	Dholka (Dholka) ...	Do. 9th February 1899.	12	600	32	916	...	26 8 2	1 14 11 R. S.	7.28
<i>Mr. D. N. Nánávati, District Deputy Collector.</i>										
	Dhandhuka (Gogha) ...	Wheat (Potalia), 25th February 1899.	11	825	51	903	250	33 15 0	2 7 0 R. S.	7.18
6	Do. (Bhekda) ...	Do. do., 7th March 1899.	11	1,310	65	751	120	27 15 2	1 11 2 R. S.	6.07
KAIRA.										
<i>Mr. F. X. D'Souza, Assistant Collector.</i>										
7	Mehmadabad (Kaira) ...	Rice (Sutarsál), 15th October 1898.	16	2,600	56	2,282 in husk.	2,050	59 6 0	8 3 10 R. S.	13.89
PANCH MAHA'LS.										
<i>Mr. H. D. Rendall, Assistant Collector.</i>										
8	Godhra (Ambáli) ...	Spiked millet (Bájni), 31st October 1898.	12	825	17	551	680 bundles.	15 6 3	1 5 0 O. S.	8.52
<i>Mr. S. M. Bharucha, District Deputy Collector.</i>										
9	Dohad (Kharedi) ...	Rice (Jádi Sutarsál), 2nd November 1898.	15	1,125 in husk	61	675 clean rice, 41 broken rice.	1,644 chaff, 102 husk.	20 0 1	2 0 0 R. S.	10.0

Northern Division, 1898-1899.

R. S.=Revision Survey.

Area of Test.	Equivalent in Tolas of local measure Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
		Principal Product.	By-Product.	
12	13	14	15	16
A. g.	Tolas.	Lbs.	Cwts.	
0 8	40 (weight).	53½	45½ bundles.	<i>Experiment No. 1.</i> — <i>Udvali</i> or early ripening <i>jowar</i> on dry-crop <i>gorādu</i> land growing <i>bājri</i> with subordinate pulses during the past three years. Field manured with 18 carts of cowdung per acre. Cultivation careful and season favourable. Crop only 9 annas of the formulae.
0 8	Do.	26½	...	<i>Experiment No. 2.</i> —Irrigated wheat, <i>Vājia</i> , as a second crop on <i>gorādu</i> land growing <i>bājri</i> and subordinate crops followed by wheat or maize or both on a small part of the field. Crop watered from a well in the field. Season fair and tillage good. Twenty carts of cattle-dung manure applied per acre to the first crop. By-product neither weighed nor valued. The outturn represents an eleven-anna crop of the formulae.
0 8	Do.	36½	...	<i>Experiment No. 3.</i> —Gram as a second crop on good <i>besar</i> land growing rice every year followed by gram whenever moisture sufficient. Twenty carts of village manure per acre applied to the rice, which is helped by canal water, at a cost of Rs. 7 per acre. Seed-rate high. Season and tillage good. The incidence in column 11 calculated on the second crop alone.
0 8	Do.	34½	...	<i>Experiment No. 4.</i> —Gram on ordinary black soil growing, without irrigation, wheat generally and occasionally gram. Field manured 2 years ago with about 7½ carts of cowdung per acre. Season only fair, later rains being insufficient. Cultivation good. Outturn full maximum of the formulae.
0 8	Do.	27½	2½	<i>Experiment No. 5.</i> —Dry-crop wheat, <i>Potalia</i> , on similar soil growing without manure (1) wheat, (2) <i>sesamum</i> and (3) <i>jowar</i> in rotation. Season and tillage as above. Outturn full average.
0 10	Do.	27½	2½	<i>Experiment No. 6.</i> —Irrigated wheat of the same variety on sandy black soil growing <i>bājri</i> in the kharif season followed by wheat or <i>jowar</i> in the rabi. Field manured with 12 carts of ordinary manure per acre and the crop watered 12 times from a well in the field. Season favourable and tillage good. The crop slightly damaged by rust. Seed-rate low and outturn only a 6-anna crop of the formulae.
0 8	Do.	41	4½	<i>Experiment No. 7.</i> —Rice, <i>Sutarsāl</i> , on good <i>kidri</i> land growing rice every year followed by wheat in favourable seasons. Field manured with 11 a carts of night-soil manure per acre. Six gunthas of seed-bed furnished seedlings sufficient to plant 1 acre 34 gunthas. Season favourable and tillage good. The crop was irrigated from a well in the field and also apparently from a tank. Outturn 14 annas of the formulae.
0 8	40 (weight).	54½	128 bundles.	<i>Experiment No. 8.</i> — <i>Bājri</i> on <i>gorādu</i> land growing <i>bājri</i> for two years followed by <i>kodra</i> and <i>banti</i> in the third. About 10 carts of manure applied per acre. Season generally good and cultivation fair. Outturn about 8 annas of the formulae.
0 10	Do. ..	38½ clean rice, 115½ broken rice.	8½ chaff, 2½ husk.	<i>Experiment No. 9.</i> —Unmanured and unirrigated rice, <i>Jādi Sutarsāl</i> , on brown saltish soil growing the same crop followed by gram every year. Field manured two years ago with 12 carts of cattle manure per acre. Season favourable.

Summary of Crop Experiment Reports,

O. S.=Original Survey;

No.	District, Taluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formula.	AVERAGE PER ACRE.					
					Seed.	Yield of		Total Value of Produce.	Assessment excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.
						Principal Product.	By-Product.			
1	2	3	4	5	6	7	8	9	10	11
	PANCH MAHALS— <i>continued.</i> <i>Mr. S. M. Bharucha,</i> <i>District Deputy Collector—</i> <i>continued.</i>		Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.
10	Dohad (Nimvália) ...	Paspalum Scrobiculatum (Kodra), 16th November 1898.	10	940	20	985	1,280	7 5 7	0 11 3 R. S.	9.56
11	Do. (Pethápúr) ...	Sesamum (Tal), 1st December 1898.	11	450	7½	222 seed.	562	7 15 8	0 10 1 R. S.	7.89
	BROACH. <i>Mr. Sorábshá Hormusji,</i> <i>District Deputy Collector.</i>									
12	Anklesvar (Chorási) ...	Rice (Jádu Saliu), 18th October 1898.	9	1,125	82	1,847 in husk.	1,950	47 15 6	12 4 5 O. S.	25.59
13	Do. (Anklesvar) ...	Sesamum (Tal), 8th January 1899.	12	600	1½	326 seed.	...	19 13 6	5 0 7 O. S.	25.38
	SURAT. <i>Mr. O. V. Vernon,</i> <i>Assistant Collector.</i>									
14	Chorási (Vesu) ...	Rice (Kada), 26th October 1898.	10	1,500	70	2,058 in husk.	1,680	57 10 6	9 1 5 O. S.	15.76
15	Olpád (Kathodra) ...	Great millet (Bhar Jowár), 22nd December 1898.	16	1,600	7	1,079	435 bundles kadbi, 247 chaff.	26 4 6	5 10 4 O. S.	21.48
16	Do. (Sándhier) ...	Do. do. 4th January 1899.	16	1,600	10	897	385 bundles kadbi, 152 chaff.	21 12 1	5 14 2 O. S.	27.05
17	Do. (do.) ...	Do. do.	16	1,600	10	931	405 bundles kadbi, 161 chaff.	22 9 5	5 4 2 O. S.	23.28

Northern Division, 1898-99—continued.

R. S.= Revision Survey.

Area of Test.	Equivalent in Tolas of local measure Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
		Principal Product.	By-product.	
12	13	14	15	16
A. g.	Tolas.	Lbs.	Cwtr.	
0 10	40 (weight.)	155	11	Experiment No. 10.—Kodra on inferior black stony soil at the foot of a hill growing (1) <i>banti</i> , (2) <i>ramtal</i> and (3) <i>kodra</i> during the past three years. Field never manured. Season favourable; tillage bad. Grain valued at a suspiciously low rate.
0 10	Do. ...	29	14	Experiment No. 11.—Sesamum on <i>goradu</i> soil. No manure ever applied. Rotation undefined. Apparently same crop grown during the past 2 years. Season as above. Tillage indifferent. Seed-rate high. Yield represents less than a 6-anna crop of the formulae.
0 8	Do. ...	41	5	Experiment No. 12.—Rice, <i>Jadu Salu</i> , on highly assessed good <i>gorat</i> , light sandy soil growing the same crop every year followed by wheat in seasons of favourable rainfall. Land manured with 16 carts per acre of farm-yard manure. Season fairly good, and tillage good.
0 8	Do. ...	16½	...	Experiment No. 13.—Sesamum on light <i>goradu</i> soil growing <i>jowar</i> and sesamum in alternate years. Land manured with 7 carts of ordinary manure every year. Season, &c., as above. The outturn is probably overestimated at 12 annas.
0 8	37½ (weight.)	41	2	Experiment No. 14.—Inferior rice, <i>Kada</i> , on good <i>besar</i> land growing the same crop every year. About 27 carts of cattle dung applied per acre, the seed-bed receiving double this quantity. One guntha of seed-bed is stated to have furnished seedlings for 22 gunthas of the field. Season somewhat unfavourable, rains being insufficient for the crop. Tillage good. Yield represents a 14-anna crop of the formulae.
0 8	37 (weight.)	49½	133 bundles 1½ chaff.	Experiment No. 15.— <i>Bhar jowar</i> on <i>gorat</i> soil growing <i>jowar</i> and cotton in alternate years. Land not manured since 1895-96 when about 8 carts of ordinary manure applied per acre. Season favourable and tillage excellent. Outturn 11 annas according to formulae.
0 8	Do.	49½	133 bundles 1½ chaff.	Experiment No. 16.—Same crop on black soil under similar rotation. Three carts of cattle-dung manure applied per acre. Season, &c., as above. The yield represents a 9-anna formulae crop.
0 8	Do.	49½	133 bundles 1½ chaff.	Experiment No. 17 Do. manured by folding goats. Other remarks as above. do. Field



Summary of Crop Experiment Reports,

O. S. = Original Survey;

No.	District, Táluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formula.	AVERAGE PER ACRE.					
					Seed.	Yield of		Total Value of Produce.	Assessment excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.
						Principal Product.	By-Product.			
1	2	3	4	5	6	7	8	9	10	11
SURAT—continued.			Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.
<i>Mr. S. R. Master, District Deputy Collector.</i>										
18	Balsár (Mográvádi) ...	Rice (Kada) followed by ...	12	2,250	135	1,808 in husk.	2½ cart loads.	41 13 2	19 10 8 O. S.	32·78
19	Do. (do.) ...	Dolichos lablab (Vál).	10	600	80	622	670	15 2 8		
20	Balsár (Atak Párdi) ...	Rice (Kada) ...	13	2,440	135	2,183 in husk.	2½ cart loads.	49 11 3	12 13 9 O. S.	25·87
21	Do. (Tithal) ...	Paspalum scrobiculatum (Kodra).	12	1,275	34	1,800	...	35 10 6	1 7 9 O. S.	4·16
THANA.										
<i>Mr. W. O. Shepherd, Assistant Collector.</i>										
22	Bassein (Dhavale) ...	Sugarcane (red variety), 3rd May 1899.	13	4,250	10,000	9,538 gul.	...	666 8 0	9 1 11 R. S.	1·37
23	Sálsette Májre (Dávde) ...	Rice (Patni), 14th October 1898.	13	1,700	119	2,024	300 bundles.	81 0 0	9 0 11 R. S.	11·18
<i>Mr. D. M. Patvardhan, District Deputy Collector.</i>										
24	Dáhánu (Malyán)...	Do. (Ghosálvel and Káli Dángar), 3rd November 1898.	12	1,600	72	1,775 1,120	3,835 1,600	67 6 10	4 14 2 O. S.	7·24
25	Máhim (Kelve) ...	Ginger (Ale), 13th May 1899.	14	5,400	2,800	2,895 17,360	5,435 740			
26	Do. (do.) ...	Sugarcane, 13th May 1899.	12	...	2,050 canes.	16,400 canes weighing 47,560	13,120 tops.	244 12 8	5 10 3 O. S.	2·30
27	Do. (do.) ...	Plantains (Rájeli), 30th June 1899.	12	80,000	720 off-shoots.	50,400. plantains.	720 flowers, 2,160 shoots, 7,200 sheaths.	148 5 0	5 10 3 O. S.	1·25

Northern Division, 1898-99—concluded.

R. S. = Revision Survey.

Area of Test.	Equivalent in Tolas of local measure Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
		Princi- pal Product.	By- Product.	
12	13	14	15	16
A. g.	Tolas.	Lbs.	Cwt.	
0 4	37½ (weight.)	47½	¾ carts	<i>Experiment Nos. 18 and 19.</i> —Rice, <i>Kada</i> , followed by <i>vāl</i> on blackish <i>barad</i> land growing the same crops every year and occasionally sugarcane. Field manured with 53 carts of cowdung per acre for the rice. Seed-rate high. Area of seed-bed furnishing seedlings for transplantation not reported. Later rains somewhat deficient, but the crop receives irrigation assistance from an adjoining tank. Tillage good. The incidence in column 11 calculated on the double crop of rice and <i>vāl</i> .
0 4	Do.	57¾	1¾	
0 4	37½ (weight.)	47½	Do.	<i>Experiment No. 20.</i> — <i>Kada</i> rice on pure black soil. Second crop of <i>vāl</i> grown only in seasons of ample rainfall. It was grown in each of the previous two seasons. 28 carts of ordinary cowdung manure applied per acre. The crop irrigated from an adjoining tank. Season, &c., as above.
0 4	Do.	50½	...	<i>Experiment No. 21.</i> —Kodra on <i>dādari</i> black soil which grew castors in the past year and had been under grass previously. No manure used. Outturn full maximum of the formula; Test area only half the prescribed minimum.
0 4	...	14½	...	<i>Experiment No. 22.</i> —Red hard sugarcane on <i>agri bāgāyat</i> land growing (1) sugarcane, (2) sweet potatoes, (3) fallow or rice. The test crop manured with about 4½ tons of castorcake applied in three dressings and watered from a private well, but its extent not reported. Crushed cane used as <i>rāb</i> . Crop full average. Season favourable and tillage good. The by-products mostly used in the manufacture of <i>gul</i> ; hence their value, estimated at Rs. 37-8 per acre by the experimenter, not included in column 9.
0 10	48¾	39¾	10 bun- dles.	<i>Experiment No. 23.</i> —Rice, <i>Patni</i> , on ordinary kharif land growing the same crop every year. A cart-load of fish manure used per acre before sowing. Crop raised from transplanted seedlings, but the area of seed-bed not reported, and the seed-rate given seems excessive. Late rains deficient. Tillage good. Rice straw valued very high at Rs. 30 per acre. Crop full maximum of the formula.
0 8	27½ 28	43 47½	19½	<i>Experiment No. 24.</i> —Rice, <i>Ghosdvel</i> and <i>Kālī Dāngar</i> , on ordinary black kharif land growing the same crop every year without manure and without a second crop. Seed-bed, the extent of which not reported, liberally <i>rābed</i> with cowdung and grass. Season very fair; tillage fair. Outturn ½ times the full maximum of the formula.
0 4	78 (weight.)	21	1½	<i>Experiment No. 25.</i> —Ginger on <i>valant</i> soil irrigable from a well, and growing (1) ginger, (2) sugarcane, (3) plantains and (4) fallow or seed-bed for rice. Castor-cake manure at the rate of 5 tons per acre applied in three top dressings. Rains excessive. Tillage good. Seed-rate high and outturn suspiciously high.
0 4	...	69 canes	18¾	<i>Experiment No. 26.</i> —Sugarcane on another part of the above field. Rotation as above. About 2 tons of castorcake per acre applied in three dressings. Season and tillage as above. The crop irrigated three times after planting before the rains and once a week after the close of the monsoon. Crop sold for raw eating and not turned into <i>gul</i> .
0 4	...	140 plan- tains.	256 flowers, 32 shoots, 400 sheaths.	<i>Experiment No. 27.</i> —Plantains on another part of the same field. Three dressings of castorcake given as above. Crop watered seven times per month. Other remarks as above.

Summary of Crop Experiment

O. S. = Original Survey ;

No.	District, Taluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formula.	AVERAGE PER ACRE.					
					Seed.	Yield of		Total Value of Produce.	Assessment excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.
						Principal Product.	By-Product.			
1	2	3	4	5	6	7	8	9	10	11
KHANDESH.			Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.
<i>Mr. F. J. Varley, Assistant Collector.</i>										
28	Sindkheda (Valkhed) ...	Rice (Dodki Sál), 16th November 1898.	8	525	28	649 in husk.	1,723	21 14 10	1 5 2 R. S.	6.03
<i>Mr. Shálon Bápúji, District Deputy Collector.</i>										
29	Pimpalner (Dusáne) ...	Do. (Sáti), 27th November 1898.	10	1,395	60	2,264 in husk.	3,800	42 8 0	3 0 10 O. S.	7.18
30	Sháháde (Sarankhede) ...	Gram, 6th January 1899.	10	435	71	409	700	13 12 0	2 10 3 O. S.	19.20
<i>Mr. S. O. Joshi, District Deputy Collector.</i>										
31	Chálisgaon (Táekli) ...	Do. (Jádi or Dodki Sál), 9th November 1898.	10	930	11½	367 in husk.	1,086	9 6 0	1 3 6 R. S.	13.00
32	Do. (Báhál) ...	Rice (Sakhvel), 7th December 1898.	10	1,395	16	291 in husk.	1,330	9 6 0	0 9 2 R. S.	6.11
33	Jámner (Neri Budruk) ...	Gram (Harbhara), 1st February 1899.	10	375	44	443	554	13 4 0	2 14 0 R. S.	21.69
NASIK.										
<i>Mr. A. H. A. Simcox, Assistant Collector.</i>										
34	Málegaon (Saunádne) ...	Cotton (Pátha), 10th November 1898.	12	320	41	1,019 seed cotton.	...	39 8 6	1 9 6 O. S.	4.03
<i>Mr. Motilál Chumilál, District Deputy Collector.</i>										
35	Niphád (Nándurdi) ...	Sugarcane (Pundia), 10th to 12th January 1899.	12	4,800	Plants from 2½ gunthas.	5,590 gul.	...	340 10 0	4 10 0 R. S.	1.36

Reports, Central Division, 1898-99.

R. S.=Revision Survey.

Area of Test.	Equivalent in Tolas of local measure Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
		Principal Product.	By-Product.	
12	13	14	15	16
A. g.	Tolas.	Lbs.	Cwts.	
0 4	110	38½	5½	Experiment No. 28.—Drilled rice, <i>Dodki Sál</i> , on black sandy <i>ráichikan</i> soil growing cotton, <i>jowári</i> <i>bájrí</i> , sweet potatoes and rice, the last only occasionally. The field manured every third year. This year 12 carts per acre were given. The crop watered from a well in the field made since settlement, but the extent of irrigation is not reported. Season unfavourable. Tillage good. Seed-rate low.
0 16	138	56½	13½	Experiment No. 29.—Broadcast rice, <i>Sáti</i> , on light black soil growing wheat during the past four years on a part of the field and on the remainder grass or some other crop. Last year groundnut was grown. Crop irrigated from canal water but its extent not reported. About 25 carts of ordinary manure applied per acre. Season favourable and tillage good. Outturn full maximum of the formulæ. The sample <i>ser</i> weighed 149 <i>tolas</i> or 11 <i>tolas</i> in excess of the weight recorded by the experimenter.
0 8	133	31½	10	Experiment No. 30.—Unmanured and unirrigated gram on similar black soil field which usually grows cotton and <i>jowári</i> in alternate years. Season favourable and tillage good. Seed-rate high. The sample <i>ser</i> weighed in this office gave an excess of 8 <i>tolas</i> . Pulse priced low.
0 8	110	45½	7½	Experiment No. 31.—Drilled rice, <i>Dodki Sál</i> , on a small portion of <i>ráichikan</i> soil growing principally <i>jowári</i> and cotton in alternate years and rice only on a small patch. About 17 carts of cattle-dung manure applied per acre. The field irrigable from a private well constructed since settlement and the test crop watered twice before ripe for harvest. Season ordinary. Tillage indifferent. Seed-rate low. Outturn poor, being only 7 annas of the formulæ.
0 8	103	42½	4½	Experiment No. 32.—Transplanted rice, <i>Sukhvel</i> , on <i>bhurat khárwat</i> soil under similar conditions. The crop watered four times after the rains at an interval of a fortnight between each watering. Other remarks as above. Outturn only 4 annas of the formulæ standard.
0 8	144	37	4	Experiment No. 33.—Gram on superior black soil growing usually cotton and <i>jowári</i> in alternate years. No manure given to the test crop. Season, &c., as above. Outturn normal. The sample <i>ser</i> received in this office weighed 5 <i>tolas</i> in excess of the reported weight. Pulse priced low.
0 10	80 (weight).	25½	...	Experiment No. 34.—Cotton, <i>Patha</i> , on medium black soil manured with about 36 carts per acre of sheep and goat dung. Previous cropping not reported. Season fair and tillage good. Seed-rate high. The crop apparently picked all in one day which seems incredible. The reported outturn three times a full average crop of the district.
0 4	Do.	16½	...	Experiment No. 35.—Sugarcane, <i>Pundia</i> , on good black soil locally called <i>munjálí</i> , irrigable both from a well in the field and a <i>pát</i> . Groundnut, sesamum, wheat and gram were grown in 1896-97, and <i>bájrí</i> , <i>udid</i> and hemp in 1897-98. Field manured with about 20 carts of cowdung per acre. The extent of irrigation not reported. Season favourable and tillage good. The value of the by-product, crushed cane and green tops, not included in column 9, as the former is used as fuel in making the <i>gul</i> and the latter fed to cattle working the mill.

Summary of Crop Experiment Reports,

O. S. = Original Survey;

No.	District, Taluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formula.	AVERAGE PER ACRE.					
					Seed.	Yield of		Total Value of Produce.	Assessment excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.
						Principal Product.	By-Product.			
1	2	3	4	5	6	7	8	9	10	11
NA'SIK—continued.			Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.
<i>Mr. W. Plunkett, District Deputy Collector.</i>										
36	Násik (Sátpur) ...	Eleusine coracana (Nágli), 26th November 1898.	10	980	4½	752	600	19 13 8	1 1 4 R. S.	5.45
37	Do. (do.) ...	Do. do. 27th November 1898.	12	1,200	4½	1,687	1,720	47 8 5	1 4 0 R. S.	2.63
38	Dindori (Dindori)...	Wheat (Kátha), 18th March 1899.	12	1,080	83	1,486	...	39 6 0	8 7 10 R. S.	21.56
<i>Mr. W. D. Wilkins, Superintendent, Land Records and Agriculture, C. D.</i>										
39	Sinnar (Sinnar) ...	Do. 10th February 1899.	10	560	76	497	565	17 15 0	1 2 6 R. S.	6.44
40	Násik (Deoláli) ...	Gram, 21st February 1899.	10	405	114	1,417	1,100	46 15 6	2 9 7 R. S.	5.53
AHMADNAGAR.										
<i>Mr. F. G. H. Anderson, Assistant Collector.</i>										
41	Akola (Váki) ...	Rice (Jirvel and Ráyabhoga mixed), 17th November 1898.	12	2,400	...	987 in husk	...	30 2 11	1 15 4 R. S.	6.49
42	Sangamner (Nimgaon Játí).	Wheat (Bakshi), 26th February 1899.	12	1,080	111	1,191	...	41 13 9	0 12 8 R. S.	1.89
43	Do. (do.) ...	Wheat (Kátha), 26th February 1899.	6	270	45	672	...	23 7 0	1 3 4 R. S.	5.15
44	Do. (do.) ...	Gram, 26th February 1899.	7	165	38	592	...	14 10 3	1 3 8 R. S.	8.39

Central Division, 1898-99—continued.

R. S. = Revision Survey.

Area of Test.	Equivalent in Tolas of local measure Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
		Principal Product.	By-Product.	
12	13	14	15	16
A. g.	Tolas.	Lbs.	Cwt.	
1 0	91½	39½	5½	<i>Experiment No. 36.</i> — <i>Nāgli</i> on blackish <i>barad</i> soil. Rotation undefined, the past three years' cropping being (1) hemp, (2) fallow, (3) <i>nāgli</i> , wheat, linseed and chillies. No manure applied. Season fair; tillage indifferent. The sample <i>ser</i> weighed in this office gave an excess of 5½ <i>tolas</i> over the reported weight. Test area unnecessarily large.
0 15	86½	37½	5½	<i>Experiment No. 37.</i> —Same crop on similar soil newly brought under cultivation. The field manured with about 23½ carts of cowdung per acre. Season fair and tillage good. Outturn full maximum of the formulæ. The sample <i>ser</i> weighed in this office 91½ <i>tolas</i> .
0 4	118½	36½	...	<i>Experiment No. 38.</i> —Irrigated wheat, <i>Kātha</i> , on good black <i>bāgāyat</i> land growing during the past three years (1) hemp and sugarcane, (2) groundnuts, and (3) <i>methi</i> , wheat and rice. Field heavily manured. The crop watered from an adjoining channel, but the extent of irrigation not reported. Season fair; tillage good. The by-product, though useful as fodder, not valued. Outturn full maximum of the formulæ standard.
0 8	114	29½	5½	<i>Experiment No. 39.</i> —Unmanured and unirrigated wheat on reddish black soil mixed with lime growing (1) wheat, (2) <i>bājri</i> , <i>tur</i> and wheat, and (3) <i>bājri</i> and <i>tur</i> during the past three years. Rains after sowing deficient. Cultivation good.
0 4	115	38½	1	<i>Experiment No. 40.</i> —Irrigated gram as a second crop after <i>bājri</i> on good black <i>bāgāyat</i> land growing with irrigation assistance a variety of rich garden crops such as sugarcane, plantains, onions, carrots, &c. The land is manured only once in three years; none applied this year. The crop watered only twice from a well in the field, as the supply was required for wheat grown in another part of the field. Season favourable and tillage good. The by-product valued very high at Rs. 10 per acre. The sample <i>ser</i> weighed in this office gave an excess of 6 <i>tolas</i> .
0 4	75	34½	...	<i>Experiment No. 41.</i> —Rice, <i>Jirael</i> and <i>Bāyabhoga</i> , equally mixed on good loamy yellow soil growing every year rice followed by wheat or other crop. No manure applied to the field; the seed-bed was, however, raked as usual. Season and tillage normal. Outturn about 8 annas of the formulæ standard. By-product not weighed, but valued at Re. 1-10-8 per acre.
0 4-3	117½	30½	...	<i>Experiment No. 42.</i> —Irrigated wheat, <i>Bakshi</i> , on medium black soil growing <i>bājri</i> in the kharif season followed by a variety of irrigated crops such as vegetables, wheat, &c. The field manured with about 10 tons of farm-yard manure and sweepings per acre. The crop watered from a well recently built with aid of <i>Tagdi</i> . Cultivation good. By-product not weighed but its value included in column 9. The sample <i>ser</i> received in this office gave an excess of 5 <i>tolas</i> over the reported weight.
0 5½	111	30	...	<i>Experiment No. 43.</i> —Irrigated wheat, <i>Kātha</i> , on medium black soil growing <i>bājri</i> followed by wheat or gram with irrigation assistance every year. No manure was applied for the test crop. Season unfavourable as the late rains were scant and the water in the well not sufficient for the whole field. Tillage ordinary. Outturn 9 annas of the formulæ standard. Incidence on the second crop alone. The sample <i>ser</i> gave an excess of 4½ <i>tolas</i> in this office. The by-product not weighed but its value entered in column 9.
0 4	115½	41½	...	<i>Experiment No. 44.</i> —Irrigated gram on similar soil under like conditions. Season, &c., as above. Outturn full maximum for a dry crop. Incidence on the second crop alone.

Summary of Crop Experiment Reports,

O. S.=Original Survey;

No.	District, Taluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formula.	AVERAGE PER ACRE.					
					Seed.	Yield of		Total Value of Produce.	Assessment excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.
						Principal Product.	By-Product.			
1	2	3	4	5	6	7	8	9	10	11
	AHMADANAGAR— <i>continued.</i>		Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.
	<i>Mr. W. H. J. Wilkinson,</i> <i>Assistant Collector.</i>									
45	Shrigonda (Shrigonda) ...	Great millet (Jowári), 31st January 1899.	12	960	6	1,625	520 bundles kadbi, 49 chaff.	34 7 2	1 0 10 R. S.	3.05
	<i>Mr. N. K. Pendse,</i> <i>District Deputy Collector.</i>									
46	Nevása (Bhánas Hivre) ...	Do. do. 1st February 1899.	10	810	5½	691	370 bundles, 82 chaff.	15 0 11	1 4 3 R. S.	8.41
47	Sheogaon (Bhagur) ...	Wheat and safflower (Kardai), 20th February 1899.	8	350 60	33 ½	516 63	... ...	17 3 2 1 4 0	1 3 10 O. S.	6.72
	POONA.							18 7 2		
	<i>Mr. E. L. Sale, Assistant Collector.</i>									
48	Purandbar (Shivre) ...	Spiked millet (Bájri), 18th October 1898.	12	640	8½	548	255 bundles.	17 6 7	0 14 6 R. S.	5.20
49	Sirúr (Sirúr) ...	Wheat (Bakshi) ...	10	840	43	568	770 bundles.	20 8 0	1 1 10 R. S.	5.43
	<i>Mr. O. S. F. Crofton, Assistant Collector.</i>									
50	Mával (Vadgaon) ...	Rice (Ambemohor), 15th November 1898.	15	2,850	80	1,593 in husk.	1,600	49 4 0	2 6 2 R. S.	4.84
51	Khed (Khed) ...	Groundnut (Bhui-mug), 13th December 1898.	2	200	80	960 in shell.	4,000	29 6 0	6 1 9 R. S.	20.79
52	Mával (Talegaon) ...	Wheat (Potya), 11th February 1899.	10	500	90	320	270	13 9 4	1 14 7 R. S.	14.07

Central Division, 1898-99—continued.

R. S.—Revision Survey.

Area of Test.	Equivalent in Tolas of local measure Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
		Principal Product.	By-Product.	
12	13	14	15	16
A. g.	Tolas.	Lbs.	Cwt.	
0 5	120	61½ bundles kadbi, 1½ chaff.	66	<i>Experiment No. 45.</i> —Irrigated <i>jowári</i> on black <i>kalpoti</i> soil growing the same crop every year on the major portion of the field and wheat, chillies, sweet potatoes, &c., in small patches. The field manured with about 25 carts of ordinary manure per acre. Season not favourable but the crop helped by irrigation from a well in the field. Tillage good. The grain valued very cheap. The experimenter forwarded to this office the contents of a <i>weight ser</i> instead of the <i>local measure ser</i> as required by standing orders.
0 8	110	56½ bundles kadbi, 4½ chaff.	140	<i>Experiment No. 46.</i> —Rabi <i>jowári</i> mixed with <i>kardav</i> on blackish <i>kalvat</i> soil growing cotton, <i>tur</i> , <i>jowári</i> , <i>kardai</i> , &c., in undefined rotation. The land remained uncultivated in 1896-97. No manure ever applied. Season fair; tillage good. Subordinate crop not tested. Grain valued rather low.
0 10	117 88	30 47½	... ..	<i>Experiment No. 47.</i> —Dry-crop wheat mixed with safflower on black <i>morwandi</i> soil, which grew without manure (1) wheat, (2) <i>jowári</i> and (3) gram mixed with safflower in each case during the past three years. Season ordinary; tillage good. By-product neither weighed nor valued. Outturn 10 annas of the formula standard.
0 8	91	32½ bundles.	400	<i>Experiment No. 48.</i> — <i>Bájrí</i> on ordinary <i>jirdyat</i> black soil growing without any definite rotation kharif and rabi <i>jowári</i> , gram, <i>tur</i> and <i>bájrí</i> . Land manured every other year, the application to the test crop being about 9 carts of cowdung per acre. Season and tillage very fair. Outturn fair. The sample <i>ser</i> weighed 3 <i>tolas</i> short of the reported weight.
0 4	123	31½ bundles.	300	<i>Experiment No. 49.</i> —Irrigated wheat, <i>Bakshi</i> , on light deep soil which had not been manured during the past three years. <i>Jowári</i> and <i>bájrí</i> were grown during the past year and <i>bájrí</i> alone previous to that. Season fair, late rains being deficient. The crop watered from a one <i>mot</i> well, which, however, had only a scanty supply of water. Tillage fair. Outturn much below the average for an irrigated crop.
0 8	84½	43½	1½	<i>Experiment No. 50.</i> —Rice, <i>Ambemohor</i> , on rich black <i>gaddi</i> soil growing the same crop every year. No manure was given to the field but the seed-bed liberally raked as usual and the test area was selected from this seed-bed. Proportionate area of seed-bed to that of plantation given at 1 guntha per acre which is very low. Season fair; late rains deficient. Tillage good. Seed-rate high. Rice straw valued very high at Rs. 12-8 per acre. The crop irrigated from a diverted stream but its extent not reported. Outturn only 9 annas of the formula standard.
0 4 (weight.)	78	42½	5½	<i>Experiment No. 51.</i> —Groundnut on medium black soil growing the same crop in rotation with chillies during the past three years. About 5 tons of cattle dung and sweepings per acre applied before sowing. The crop was irrigated by a <i>pát</i> fed from a stream. Late rains deficient. Cultivation good. Seed-rate high. Outturn much underestimated at 2 annas; but crop blighted. By-product valued high at Rs. 6-14 per acre.
0 8	104	25	3	<i>Experiment No. 52.</i> —Dry-crop, <i>Potya</i> , wheat on medium black <i>garhali</i> land which grew during the past three years (1) wheat, (2) <i>jowári</i> , (3) gram. <i>San</i> hemp ploughed in as green manure. Season and tillage as above. Seed-rate high. Outturn poor and overestimated at 10 annas.

Summary of Crop Experiment Reports,

O. S.=Original Survey;

No.	District, Taluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formula.	AVERAGE PER ACRE.					
					Seed.	Yield of		Total Value of Produce.	Assessment excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.
						Principal Product.	By-Product.			
1	2	3	4	5	6	7	8	9	10	11
	SHOLAPUR.			Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.
	<i>Mr. R. P. Bengiri, District Deputy Collector.</i>									
53	Málsiras (Bhámudi) ...	Groundnut (Bhuni-mug), 15th January 1899.	8	1,400 in shell.	85	688 shelled nuts.	2,461	44 6 0	1 1 9 R. S.	2.50
54	Pandharpur (Korti) ...	Sugarcane (Pundia), 2nd April 1899.	8	2,100	8,291	4,646 gul.	20,000 seed canes.	288 13 8	0 7 8 R. S.	0.16
	<i>Mr. W. D. Wilkins, Superintendent, Land Records and Agriculture, C. D.</i>									
55	Mádhe (Mádhe) ...	Groundnut (Bhuni-mug), 14th December 1898.	8	1,400	103	611 in shell.	...	15 14 9	0 13 0 R. S.	5.10
	SATARA.									
	<i>Mr. P. E. Percival, Assistant Collector.</i>									
56	Jávli (Medhe) ...	Eleusine coracana (Nágli), 13th November 1898.	8	700	10	526	...	17 2 3	0 11 3 R. S.	4.10
57	Do. (Belavde) ...	Rice (Ráybhog), 16th November 1898.	12	3,200	32	1,262 in husk.	1,472	41 4 0	7 4 8 R. S.	17.67
58	Vái (Dhávdi) ...	Do. do. 23rd November 1898.	10	1,860	44	1,131 in husk.	1,460	36 9 0	7 12 0 R. S.	21.19
59	Jávli (Pimpri) ...	Wheat (Khapli) ...	16	1,800	165	669	...	21 5 10	3 10 2 R. S.	17.01
	<i>Mr. C. E. Palmer, Assistant Collector.</i>									
60	Pátan (Máru) ...	Rice (Aooste), 7th November 1898.	12	3,200	182	1,670 in husk.	3,405	39 8 0	1 10 5 R. S.	4.18

Central Division, 1898-99—continued.

R. S.—Revision Survey.

Area of Test.	Equivalent in Tolas of local measure Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
		Principal Product.	By-Product.	
12	13	14	15	16
A. g.	Tolas.	Lbs.	Cwt.	
0 4	110	16½	5½	<i>Experiment No. 53.</i> —Groundnut on light sandy soil which grew <i>jowári</i> during the past three years. Field manured with about 10 cart-loads of household refuse per acre. Crop irrigated from a well in the field but the extent of irrigation not reported. Season not favourable, both the sowing and late rains being deficient. Tillage good. Outturn in column 7 is for shelled nuts which are valued rather high.
0 4	80 (weight.)	18	666 seed canes.	<i>Experiment No. 54.</i> —Sugarcane, <i>Pundia</i> , on sandy black, <i>marul</i> , soil which grows a number of irrigated crops such as onions, chillies, groundnut, sweet potatoes, &c., with assistance of well water. Field manured with 60 carts of village refuse and 28 of sheep manure. Goats were also folded on the field for two months in the hot weather. Season not favourable; rains scanty and the crop affected by disease early in the season. The caterpillars reported to be destroyed by an application of <i>karanj</i> cake with well water. Cultivation good.
0 4	Do.	39	...	<i>Experiment No. 55.</i> —Groundnut, <i>Bhuinag</i> , on medium black soil growing, with irrigation assistance a variety of crops without any definite rotation, (1) <i>jowári</i> and safflower in 1895-96, maize and irrigated wheat in 1896-97, and maize, sesamum, chillies, <i>jowári</i> , safflower and gram in 1897-98. Manured with 28 loads per acre of compost of cattle dung, ashes and refuse. Crop watered six times from a well in the field recently built. Late rains deficient. Cultivation good. Outturn poor. Seed-rate high.
0 8	92½	33½	...	<i>Experiment No. 56.</i> — <i>Rági</i> on red <i>murmád</i> soil which grew during the past four years (1) <i>sáva</i> , (2) groundnut, (3) <i>rági</i> , (4) groundnut. No manure applied to the field but the seed-bed rábed as usual. The land is irrigable from a <i>pát</i> but the portion under experiment got no water. Late rains deficient. Tillage fairly good. Outturn poor. By-product, though not weighed, valued at Re. 1-4 per acre and the amount included in column 9.
0 4	82	33½	3½	<i>Experiment No. 57.</i> —Rice, <i>Ráybhog</i> , on good rice land growing the same crop continuously every year. Seed-bed rábed as usual. Field not manured. 4 gunthas of seed-bed furnished seedlings sufficient for an acre of plantation. Season favourable and tillage good. Outturn poor, being less than 8 annas of the formulæ standard. The crop was watered from an adjoining stream a fortnight before it was ripe.
0 4	84	34½	3½	<i>Experiment No. 58.</i> —Same crop grown continuously on good marshy land without manure and without artificial watering. The seed-bed was rábed as usual. Season good. Tillage fairly good. Outturn 8 annas of the formulæ standard.
0 4	111	31½	...	<i>Experiment No. 59.</i> — <i>Khapli</i> or spelt wheat on middling <i>tari</i> (rice) land growing rice followed by wheat every year. The field was manured with sheep folding before the sowing of the first crop. The land is irrigable from a <i>pát</i> but no water from it was used for the test crop. It was, however, watered from a recently dug well. Season favourable and tillage good. The crop represents only an eight-anna crop of the formulæ.
0 4	*88	45½	11½	<i>Experiment No. 60.</i> —Rice, <i>Aoste</i> , on brown rice land growing the same crop every year followed by wheat or other crop in seasons of favourable rainfall. Five gunthas of seed-bed rábed as usual furnished seedlings sufficient for an acre of plantation. The field also manured at the rate of 15 carts of ordinary manure per acre. Season favourable; tillage good. Seed-rate high. Outturn overestimated at 12 annas.

Summary of Crop Experiment Reports.

Q. S.—Original Survey

No.	District, Taluka, Village and Experimenter,	Crop and Date of Experiment,	Local Estimate in Annas.	Yield according to Formulae.	AVERAGE PER ACRE.					
					Seed.	Yield of		Total Value of Produce.	Assessment excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.
						Principal Product	By Product.			
1	2	3	4	5	6	7	8	9	10	11
	SA TA'RA—continued. <i>Mr. O. E. Palmer,</i> <i>Assistant Collector—</i> <i>continued.</i>		Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.
61	Pátan (A'dul)	Eleusine coracana (Nágli), 24th November 1898.	16	2,000	27	485	980	13 12 0	0 14 1 R. S.	6.40
62	Do. (Nánegaon)... ..	Do. (Mohana Nágli). 29th November 1898.	16	2,000	8	766	1,300	18 6 5	2 1 9 R. S.	11.46

Central Division, 1898-99—concluded.

R. S.—Revision Survey.

Area of Test.	Equivalent in Tolas of local measure Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
		Princi- pal Product.	By- Product.	
12	13	14	15	16
A. g.	Tolas	Lbs.	Cwts.	
0 4	104 $\frac{7}{8}$	43	3 $\frac{1}{2}$	Experiment No. 61.—Nágli on reddish brown <i>mál</i> land growing during the past three years (1) <i>sáva</i> and <i>tur</i> , (2) <i>bhuimug</i> and (3) <i>nágli</i> . Land manured with 30 cart-loads of ordinary manure per acre. Season fair; later rains deficient; tillage indifferent. 1 $\frac{1}{4}$ gunthas of seed-bed supplied seedlings for an acre of field. Seed-rate high. Outturn low and much overestimated at 16 annas. Test area below the prescribed minimum.
0 8	94	48 $\frac{1}{8}$	4 $\frac{4}{7}$	Experiment No. 62.—Same crop drilled on superior blackish soil growing during the previous three years (1) <i>nágli</i> , (2) <i>udid</i> and <i>shalu jowári</i> and (3) <i>argad</i> . Field manured once in three years with about 8 carts of cattle manure per acre. Season as above. Tillage good. Outturn probably considerably over-estimated.

Summary of Crop Experiment

O. S.=Original Survey

No.	District, Táluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formula.	AVERAGE PER ACRE.					
					Seed.	Yield of		Total Value of Produce.	Assessment excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.
						Principal Product	By-Product.			
1	2	3	4	5	6	7	8	9	10	11
	BIJAPUR. <i>Mr. A. K. Cama,</i> <i>Assistant Collector.</i>		Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.
63	Sindgi (Sindgi) ...	Linseed (Agashi), 25th January 1899.	7	135	5½	250 seed.	398	12 1 5	0 15 3 R. S.	7.88
64	Bágevádi (Bágevádi) ...	Great millet (Bile Jol), 7th February 1899.	7	355	3½	599	1,875	13 12 3	0 15 3 R. S.	6.92
65	Do. (do.) ...	Wheat (Nir Godhi), 3rd March 1899.	9	650	59	1,630	...	41 13 11	1 0 10 R. S.	2.51
	<i>Mr. V. R. Kelkar,</i> <i>District Deputy Collector.</i>									
66	Bágalkot (Yadhali) ...	Wheat (Godhi), 20th January 1899.	14	900	20	643	980	18 10 9	1 1 3 R. S.	5.77
67	Do. (Sonn) ...	Great millet (Bile Jol), 2nd February 1899.	10	810	4½	848	785 bundles kadbi, 171 chaff.	18 5 3	0 15 5 R. S.	5.26
68	Do. (Dhavaleshwar). ...	Linseed (Agashi), 7th February 1899.	6	100	6	138 seed.	...	5 4 3	0 11 4 R. S.	13.45
	RATNA'GIRI. <i>Mr. G. D. Madgaonkar,</i> <i>Assistant Collector.</i>									
69	Chiplún (Chiplún) ...	Elensine coracana (Nágli), 2nd November 1898.	13	850	11½	597	960	20 2 8	1 2 6 O. S.	5.73
70	Do. (Sávarde) ...	Paspalum scrobiculatum (Harik), 16th November 1898.	16	1,000	30	656	780	9 15 1	0 3 6 O. S.	2.20
	<i>Mr. K. B. Deval,</i> <i>District Deputy Collector.</i>									
71	Ratnágiri (Shil) ...	Sesamum (GodeTil), 10th October 1898.	12	400	9	145	...	10 8 6	0 2 10 O. S.	1.68

Reports, Southern Division, 1898-99.

R. S.=Revision Survey.

Area of Test.	Equivalent in Tolas of local measure Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
		Principal Product.	By-Product	
12	13	14	15	16
A. g.	Tolas.	Lbs.	Cwts.	
0 10½	119	21½	9½	<i>Experiment No. 63.</i> —Linseed on fair black soil growing kharif and rabi <i>jowári</i> , <i>báiri</i> with pulses and oil-seeds every year. No crop was grown during the famine year 1896-97. No manure ever applied. Season fair; tillage indifferent. No count taken of a sprinkling of safflower plants estimated to have occupied ¼ of a guntha in the test area.
0 9	145½	59½	4½	<i>Experiment No. 64.</i> —Rabi <i>jowári</i> mixed with linseed on black calcareous sandy soil growing cotton and <i>jowári</i> with the pulse and oil-seeds mixture. No crop grown in the famine year. No manure used. Season fairly good. Tillage indifferent. Outturn about 9 annas of the formulæ standard and exclusive of the linseed which occupied about one-eighth of the test area.
0 4	138	39	...	<i>Experiment No. 65.</i> —Irrigated wheat on blackish sandy soil growing <i>jowári</i> and <i>báiri</i> , <i>róle</i> , &c., in the monsoon season and rabi <i>jowári</i> , wheat, chillies, barley, &c., with irrigation assistance in the rabi. No manure applied to the field but it gets the benefit of being close to the village. The crop watered from a one <i>not</i> old well in the field. Tillage fair. The outturn represents full average for careful cultivation on good land.
0 8	85	34½	37	<i>Experiment No. 66.</i> —Dry-crop wheat on good black soil growing rabi <i>jowári</i> , wheat, gram and cotton mixed with safflower in indefinite rotation. The field is occasionally flooded by the Krishna and is manured every third year, the test crop getting 18 cart-loads of cowdung and ashes per acre. Season favourable and tillage good. Seed-rate low. Outturn overestimated at 14 annas.
0 8	87	53½	315 bund-les.	<i>Experiment No. 67.</i> —Rabi <i>jowári</i> , <i>Bile Jol</i> , mixed with linseed on fair black soil growing kharif and rabi <i>jowári</i> with subordinate crops. No crop grown in 1896-97. Land manured every 4th year, the tested crop was manured with about 19 cart-loads per acre. Rainfall seasonable and tillage good. Linseed, which occupied every eighth row, not tested and its value not taken into account in column 9. Both the grain and <i>kadbi</i> valued at cheap rates.
0 8	73	26½	...	<i>Experiment No. 68.</i> —Linseed on somewhat poorer soil which grew during the previous year rabi <i>jowári</i> and wheat with safflower. <i>Jowári</i> sown in 1896-97 on part of the field but withered. No manure applied during the past 10 years. Season not favourable; tillage good. The outturn poor.
0 5	56½	34½	2½	<i>Experiment No. 69.</i> — <i>Nágli</i> on good rabi land growing without rest <i>nágli</i> , <i>harik</i> and <i>vari</i> in rotation. The seed-bed raked as usual. Season favourable; tillage indifferent. Outturn about 10 annas of the formulæ standard.
0 10	49	70½	11	<i>Experiment No. 70.</i> — <i>Harik</i> on fairly level <i>varkas</i> land which grows in succession <i>nágli</i> , <i>vari</i> , <i>harik</i> and <i>til</i> after 5 years' rest. No manure given. Season favourable; cultivation good. Outturn overestimated at 16 annas or maximum standard.
0 8	43	13½	...	<i>Experiment No. 71.</i> —Sesamum, last crop in the rotation on good <i>varkas</i> soil growing (1) <i>vari</i> , (2) <i>harik</i> , (3) <i>barag</i> and (4) <i>til</i> after 5 years of rest. Season and tillage good. Outturn 7 annas according to the formulæ standard.

Summary of Crop Experiment Reports,

O. S. = Original Survey;

No.	District, Táluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formulae.	AVERAGE PER ACRE.					
					Feed.	Yield of.		Total Value of Produce.	Assessment excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.
						Principal Product.	By-Product.			
1	2	3	4	5	6	7	8	9	10	11
	RATNA GIRI—continued		Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.
	<i>Mr. K. B. Deval, District Deputy Collector—contd.</i>									
72	Sangameshvar (Karjari) ...	Eleusine coracana (Nágli Khandágala) mixed with Vari, 8th November 1898.	12	800	{ 29 2	685 66	718 ...	{ 21 12 1 }	0 3 5 O. S.	0.97
73	Do. (Devle) ...	Paspalum scrobiculatum (Harik), 9th November 1898.	12	800	26	759	...	11 0 3	0 4 11 O. S.	2.79
	KA NARA.									
	<i>Mr. W. T. W. Baker, Assistant Collector.</i>									
74	Yellápur (Mulgan-kopp) ...	Rice (Antarsáli), 28th October 1898.	10	2,480	95	2,246 in husk.	1,830 bundles.	46 13 3	1 14 9 R. S.	4.10
	<i>Mr. V. D. Yennemadi, District Deputy Collector.</i>									
75	Kárwár (Shirvád) ...	Rice (Bili Pandya), 18th October 1898.	12	2,400	144	2,320	4,000 bundles.	53 2 0	5 5 8 O. S.	10.07
	<i>Mr. K. P. Joshi, District Deputy Collector.</i>									
76	Kumpta (Hiregutti) ...	Sugarcane (Dasa Khabbu), 18th March 1899.	16	6,000	10,000 seed tops.	9,309 gul.	24,080 seed tops	508 6 0	4 8 8 O. S.	0.89

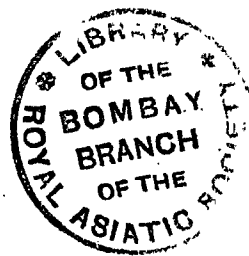
Southern Division, 1898-99—concluded.

R. S. = Revision Survey.

Area of Test.	Equivalent in Tolas of local measure Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
		Principal Product.	By-Product.	
12	13	14	15	16
A. g.	Tolas.	Lbs.	Cwts.	
0 8	58	35½	6	<i>Experiment No. 72.</i> — <i>Khandágala ndehni</i> mixed with <i>vari</i> on first class <i>varkas bhátte</i> soil growing <i>magli</i> , <i>vari</i> , <i>harik</i> and <i>til</i> after five years of rest. The land manured with 4 carts of cowdung and ashes per acre for the test crop, the first one taken after the period of fallow. Season and tillage good.
	54	44½	...	
0 8	42	69	...	<i>Experiment No. 73.</i> — <i>Harik</i> , second crop in the usual rotation after 6 years of rest. No manure given. Season, &c., as above.
0 4	116	63½	160 bundles.	<i>Experiment No. 74.</i> —Rice, <i>Antarsáli</i> , on <i>mesri gauli</i> land growing the same crop every year. No second crop ever grown owing to deficiency of water-supply. About 8 carts of the usual compost of cowdung and litter applied per acre. The field irrigable from an adjoining tank, but water used only when rains fail. Season favourable; tillage fair.
0 4	62½	48	800 bundles.	<i>Experiment No. 75.</i> —Rice, <i>Bili Pandya</i> , on sandy rice land growing the same crop every year without rest and without a second crop. Field heavily manured with compost of leaves and cowdung at 100 loads per acre. Season favourable and tillage good.
0 4	...	22½	250 seed tops.	<i>Experiment No. 76.</i> —Sugarcane, <i>Dasa Khabbu</i> , on good reddish clayey soil growing sugarcane and rice every other year. Field prepared by burning <i>ráb</i> before sowing and the crop top-dressed with compost of cowdung and grass. Season favourable and tillage good. Seed tops valued high at nearly Rs. 100 per acre.

CROP EXPERIMENTS,
BOMBAY PRESIDENCY,
1899-1900 AND 1900-1901.

I
8.



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From

F. B. YOUNG, ESQUIRE,
Acting Director, Land Records and Agriculture,
Bombay ;*.

To

H. S. LAWRENCE, ESQUIRE, I. C. S.,
Acting Secretary to Government,
Revenue Department, Bombay.

Poona, 12th December 1901.

SIR,

I have the honour to submit herewith the usual Analysis of Crop Experiments carried out in 1899-1900 and 1900-1901, prepared by Mr. P. R. Mehta, Acting Deputy Director of Agriculture. As explained in paragraph 95 of the Annual Report of the Land Records Department for 1899-1900, the experiments made during that year being considered not sufficiently large to form a separate report were left over for being dealt with along with those received during 1900-1901.

2. The subjoined table exhibits the extent of work done in each Division :—

Division.	1898-99.		1899-1900.		1900-1901.	
	Reported.	Rejected.	Reported.	Rejected.	Reported.	Rejected.
Northern Division...	37	10	...	...	31	6
Central Division ...	45	10	5	1	18	3
Southern Division ...	16	2	15	...	26	7
Total ...	98	22	20	1	75	16

3. The work of crop experiments has of recent years been considerably hampered owing to famine and plague. During 1899-1900, experiments were conducted in only four districts of the Presidency (*viz.* Sátára, Belgaum, Bijápur, and Dhárwár). Elsewhere no experiments were done (except an insulated test in Sholápur and Kánara each) as the crops had either failed or were expected to yield much below the normal outturn, and the sub-divisional officers were fully engaged in dealing with the famine. During 1900-1901 also no reports were received from the Panch Maháls, Ahmadnagar, Poona, Sholápur, and Bijápur districts; and elsewhere the officers were prevented from carrying out the programme to its full extent owing mainly to the unsatisfactory nature of the crops.

4. In view of the recent orders of Government, the analysis has this time been curtailed by Mr. Mehta as far as practicable. The method adopted by him is given below in his words :—

“ Full information regarding each test is supplied as usual in the tabular summary. The agricultural practices of the different districts have already been described in detail in the reports of the past few years and it has been considered unnecessary to repeat them from year to year. The present analysis, therefore, comprises only (1) statements made by experimenters which require explanation, (2) useful agricultural practices brought to notice by officers which deserve to be more widely known, (3) breaches of standing orders for the future guidance of the experimenters, and (4) information regarding the rental of the survey numbers experimented upon.”

5. The following statement exhibits the distribution of tests over the several crops selected for experiment during 1900-1901, the crops which find entry in the quinquennial return of outturn statistics required for the Secretary of State for India being as usual marked with an asterisk :—

Division.	* Jowari.	* Bajri.	* Rice.	* Wheat.	* Nagli.	* Kodra.	Vari.	* Gram.	Tur.	Val.	* Black Gram.	* Sugarcane.	* Sesamum.	* Linseed.	* Ground-nut.	Caster-seed.	Niger-seed.	* Cotton.	Total.
Northern Division ...	2	1	1	5	1	4	...	2	...	2	1	1	...	...	...	3	...	2	25
Central Division ...	5	1	1	...	...	...	...	1	...	...	...	1	3	1	2	...	...	...	15
Southern Division ...	...	...	5	...	3	2	1	...	1	1	...	2	...	...	...	...	4	...	19
Total ...	7	2	7	5	4	6	1	3	1	3	1	4	3	1	2	3	4	2	69

6. As directed in paragraph 3 of Government Resolution No. 8075, dated 13th November 1899, Revenue Department, a statement comparing the number of experiments asked for on each crop on each district during 1900-1901 with the number actually carried out with explanations received for not following the programme is hereto appended. Similar statement for the previous year has not been prepared as in that year experiments were arranged for in four districts only (*vide* paragraph 3 above).

7. Mr. Mehta draws certain general deductions from an examination of the experiments carried out during 1900-1901. They are given below. But it must be observed that the data furnished by a single year's experiments can hardly be sufficient to make any general deductions and in a year like the present this is particularly so because of the abnormal conditions which more or less prevailed throughout the Presidency :—

“Of the 22 experiments reported from Gujarát 4 are from Ahmadabad and Kaira each; two from Broach and the rest (12) from Surat. No experiments were undertaken in the Panch Mahals. The incidence of assessment for this Province varies from 46 per cent. (Exp. No. 11) to 3 per cent. (Exp. No. 16), the general average being 14.37 per cent. If, however, tests taken on second crops (Nos. 8, 12 and 13), which only show incidence on a part and that too a smaller part of the year's produce, be excluded, the general average falls to 11.80 per cent. which may be said to be low for Gujarát. The average value of produce per acre comes to Rs. 24-9-4 and the average assessment Rs. 2-14-5.

“From the Deccan only 15 tests have been reported. No experiments were carried out in Ahmadnagar, Poona and Sholapur. There are 9 tests from Khándesh, 5 from Sátara and only 1 from Násik. The average incidence varies from 31 per cent. (Exp. No. 34) to 2 per cent. (Exp. No. 32), the general average being 5.41 per cent. Excluding the test on sugarcane (No. 39) the average value of crop per acre comes to Rs. 38-9-7, and the average assessment Rs. 2-10-1. Experiments Nos. 27 and 32 show how good crops were obtained in Khándesh even in an year admittedly an unfavourable one.

“In the Karnátak there are only 2 tests which show an average incidence of 9 per cent. No experiments were carried out in Bijápur and those in Belgaum were rejected being on only one crop of a mixture.

“In the Konkan there are 3 tests from Thána, 4 from Kolába, 8 from Ratnágiri and 5 from Kánara. Excluding tests on second crops for reasons given above (Nos. 25 and 43) and those on sugarcane (Nos. 23, 56 and 59) the incidence varies from 19 per cent. (Exp. No. 44) to 0.33 per cent. (Exp. No. 53), the general average being 5.24 per cent. The average value of produce comes to Rs. 25-1-3, and the average assessment Rs. 1-5 per acre. But for rice tests in Kánara which yielded between Rs. 52 and 69 per acre the average value would have been much lower. The outturn of *nagli* (in Exp. No. 53) is remarkable, and the owner must have undoubtedly got the reported yield as he manured the crop with fish manure.

"There are in all 4 tests on sugarcane during the year under report. The incidence varies from 1.16 per cent. to 2.51 per cent., thus proving what has been said before that expensive garden crops are the most profitable to cultivate and that the highly assessed garden lands work out the lightest incidence of assessment and leave a much larger margin of profit than the ordinary dry-crop fields."

8. It is to be regretted that careful attention has not hitherto been paid to the question of rent paid to superior holders. As directed by Government Resolution No. 4320, dated 22nd June last, Revenue Department, every experimenter will, it is hoped, now note whether the field under experiment is cultivated by the occupant himself or by a tenant and in the latter case the amount paid as rent to the superior holder exclusive of Government demand. The present report furnishes the following information on the point:—

"From Gujarát only one instance of land sublet is reported. Here (Exp. No. 11) the rent charged (Rs. 60) is nearly double of the Government demand.

No case has been reported either from the Deccan or the Karnátak.

"From the Konkan 3 cases have been reported from Ratnágiri and 3 from Kánara. In Exp. No. 51, the field is rented for 12 lbs. of niger-seed and is assessed at 8 annas. In the second case (Exp. No. 52), the Government assessment is annas 15 and the rent charged Rs. 1-8. In the third case (Exp. No. 54), the land is assessed at 10 annas and rented for Rs. 5 per annum. The sugarcane field in Kumta (Exp. No. 56) is assessed at Rs. 31 and rented for Rs. 45 per annum. In Exp. No. 58 the field is assessed at Rs. 1-12 and the superior holder receives 63 local *sers* of paddy as rent. This is apparently an incorrect statement as the value of rice is only Rs. 2. In Exp. No. 59, the field is assessed at Rs. 3-6-10 per acre and is rented at 15 lbs. of rice per guntha of cane raised and 100 lbs. for the remainder of the field, or about Rs. 12-8 per acre for sugarcane and Rs. 2 for the rest of the field." *

9. Mr. Mehta commends Messrs. Wales, Kádri and Master (Surát district), Messrs. Patvardhan and Kalghatgi (Ratnágiri district) and Messrs. MacGregor and Mensinkai (Kánara district) for their good work.

I have the honour to be,

Sir,

Your most obedient servant,

F. B. YOUNG,

Acting Director, Land Records and Agriculture.

Statement showing the Working of the Programme of Crop Experiments during 1900-1901.

District.	Experimenter.	Experiments directed to be undertaken.	Experiments actually carried out.	Explanation, if any, for not following the Programme.
NORTHERN DIVISION.				
Ahmedabad ...	Assistant Collector in charge Daskroi Sub-Division.	Three tests on one or other of the following crops: barley, jowár, bájri, math.	No tests carried out	Absence of experiments attributed to frequent changes in the personnel of officers in charge of the Sub-Division.
	Assistant Collector in charge Viramgám Sub-Division.	Do. do. rice, wheat, gram, cotton.	One test each on gram and wheat by Mr. Nánávati.	Mr. Nánávati mistakingly thought that a test on rice done by him in the Dholka Sub-Division completed the number required.
	Assistant Collector in charge Sánand.	Do. do. barley, jowár, bájri.	One test on rice by Mr. Nánávati and one test each on wheat and gram by Mr. Dutt.	The two charges were amalgamated later in the season and the work done is for one charge only.
	District Deputy Collector in charge Dholka.	Do. do. wheat, rice, sugarcane, gram.		
Kaira ...	Assistant Collector ...	One test each on bájri, bápto and gram.	One test each on bápto, bájri and gram by Mr. Beyts.	Programme worked out.
	District Deputy Collector.	Do. do. bájri, kodra and wheat.	Two tests each on bájri and kodra and one on wheat by Mr. Modi.	Do.
Panch Maháls ...	.....	.....	.....	The programme arranged, but the selected crops turning out too poor to be worth testing, the work had to be abandoned.
Broach ...	First Assistant Collector.	Ordinary tests on bájri, jowár and láng and a special one on cotton and shíálu jowár.	One test on jowár by Mr. Vernon.	Being constantly on the move owing to pressure of famine work Mr. Vernon had no time to take more tests.
	Second Assistant Collector.	Ordinary tests on rice, jowár and sesamum and a special one on bájri and wheat.	One test each on jowár and wheat by Mr. Palmer.	Rice and bájri harvested before Mr. Palmer took charge. At sesamum harvest, Mr. Kánga, then in charge, was engaged on auditing jamabandi accounts. Mr. Palmer could not do a special test on wheat owing to pressure of famine work and did an ordinary one instead.
	Assistant Collector in charge Chorási Sub-Division.	Three tests on wheat, vól and cotton.	One test each on wheat, vól and cotton by Mr. Wales.	Programme followed.
Surat ...	Officer in charge Olpád Sub-Division.	Do. do. wheat, kodra and cotton.	One test each on wheat, kodra and cotton by Mr. Kádri.	Do.
	Officer in charge Bulsár Sub-Division.	Do. do. kodra, vól and castors.	Three tests each on kodra and castors by Mr. Master.	No explanation received for omission of tests on vól crop.
	Officer in charge Bassein Sub-Division.	A test on kodra, vari or sugarcane (crops to be preferred in the order named).	One test on sugarcane by Mr. Shepherd.	In view of the pressure of census work, the Collector directed only one experiment to be done by each officer.
Thána ...	Officer in charge Bhiwandi Sub-Division.	Do. do. vari, udid or gram (dó.).	One test on udid by Mr. Monteath.	Mr. Monteath could not find a suitable vari field in his charge and, therefore, selected udid for his test.
	Officer in charge Kalyán Sub-Division.	Do. do. nágli, udid or vól.	One test on vól by Mr. Bulákhidas.	The late Mr. Joshi carried out tests on nágli and udid, but soon after he went on leave owing to serious illness and the notes left by him were too incomplete to enable his successor to report results.
CENTRAL DIVISION.				
Khándesh ...	Officer in charge Eastern Sub-Division.	Three tests on linseed or sesamum, jowári and gram.	One test each on sesamum and jowári by Mr. Varley.	Mr. Varley could not find a suitable gram crop in any villages he visited during its harvest.
	Officer in charge Northern Sub-Division.	Do. do. ...	One test each on sesamum, jowári and gram by Mr. French.	Programme worked out.
	Officer in charge Western Sub-Division.	Do. do. ...	.....	Jowári was harvested before Mr. Brendon commenced his tour, and the other crops were far too poor to be usefully made the subject of test.

District.	Experimenters.	Experiments directed to be undertaken.	Experiments actually carried out.	Explanation, if any, for not following the Programme.
CENTRAL DIVISION—continued.				
Khándesh— continued.	Officer in charge Southern Sub-Division.	Three tests on linseed or sesamum, <i>jowári</i> and gram.	One test on <i>jowári</i> by Mr. Shalom Bapuji.	Sesamum was all cut before the orders reached Mr. Shalom. Gram and linseed were sparingly grown in the charge and Mr. Shalom was on plague duty when they were reaped.
	Officer in charge Central Sub-Division.	Do. do. ...	One test each on sesamum and <i>jowári</i> by Mr. Kelkar.	Mr. Kelkar was on leave at the time of gram harvest; his successor Mr. Shaharabudhe was busy with jumabandi, census and municipal elections work. He also states that the crop was not an average one in the charge.
Násik ...	Assistant Collector in charge Málegaon Sub-Division.	One test each on sugarcane and cotton.	One test on cotton by Mr. Simcox.	In view of the bad season, the other test abandoned.
	Assistant Collector in charge Násik Sub-Division.	One test each on <i>rági</i> and <i>báji</i>.	.....	Mr. Divátia did two tests; but the results being too poor to be useful he was permitted not to report them.
	District Deputy Collector in charge Yeola Sub-Division.	One test each on <i>jowári</i> and gram.	One test on <i>jowári</i> by Mr. Plunkett.	The gram crop was quite poor and the test on it dispensed with.
Ahmednagar ...	.....	.....	.....	The programme arranged; but the crops being too poor to be worth testing, the Collector exempted his Assistants from doing the experiments.
Poona ...	.....	.....	.....	The programme arranged; but in the Western Sub-Division kharif crops were harvested earlier than usual and the rabi ones were a total failure. The Eastern Sub-Division had no rabi and very little kharif crop in <i>jirdyat</i> lands. So no tests taken.
Sholapur ...	.....	.....	.....	No programme arranged in view of want of leisure for officers owing to the continuance of famine work and unlikelihood of crops of fair average quality becoming available.
Sátara ...	First Assistant Collector.	One test each on <i>báji</i> , groundnut and <i>rági</i> .	One test on <i>báji</i> by Mr. Turner and one on groundnut by Mr. Simcox.	Test on <i>rági</i> not carried out and no explanation received.
	Second Assistant Collector.	One test each on sugarcane, <i>báji</i> and groundnuts.	One test on <i>báji</i> by Mr. Garret and one each on groundnut and sugarcane by Mr. Turner.	Programme followed.
	Assistant Collector ...	One test each on rice, <i>báji</i> and <i>rági</i> .	One test each on rice and <i>báji</i> by Mr. Campbell.	A second test on rice was taken, but the experimenter did not report it as the test area was below the prescribed minimum.
	District Deputy Collector.	One test each on sugarcane, safflower and <i>báji</i>.	.....	Mr. Heblikar was engaged on audit duty at the time <i>báji</i> was being harvested. The other crops were rare in his charge and much below the normal.
SOUTHERN DIVISION.				
Belgaum ...	First Assistant Collector.	Three ordinary tests on one or other of the following crops: <i>báji</i> , rice, wheat, maize, <i>rági</i> , <i>rála</i> , <i>tur</i> , gram or cotton, also one special on one of the above crops.	Two tests on wheat by Mr. Artál.	Mr. Boyd, at first in charge, was engaged in inspecting prospects of the season and thus had no time to test the kharif crops. Mr. Artál, his successor, could not find a suitable crop for the third test nor could he do the special test.
	Second Assistant Collector.	Do. do. ...	One test on <i>báji</i> by Mr. Artál.	No explanation received.
	District Deputy Collector.	Do. do. ...	.....	No tests carried out as the crops selected were everywhere very much below the average.
Bijápur ...	.....	.....	.....	No programme arranged in view of the continuance of famine, and the consequent pressure of work falling on the officers.
Dhárwár ...	First Assistant Collector.	One test each on rice, <i>vari</i> , <i>kulthi</i> and sesamum.	One test on rice by Mr. Wild.	No further experiments undertaken owing to pressure of famine and jamabandi work.
	District Deputy Collector.	One test each on <i>tur</i> , castors, cotton and <i>jowári</i> .	One test on cotton by Mr. Sathaye.	Mr. Baitmangalkar, at first in charge, was engaged in famine inspection tour. Mr. Sathaye, his successor, was in Navalgunnd for opening relief works and there were no crops of <i>jowári</i> , <i>tur</i> and castors there suitable for test.
	Extra District Deputy Collector.	One test each on rice, <i>kulthi</i> , <i>jowári</i> and sesamum.	One test each on rice and <i>jowári</i> by Mr. Baitmangalkar.	Sesamum was all reaped before the orders reached the officer and <i>kulthi</i> was almost a failure in the charge.

District.	Experimenter.	Experiments directed to be undertaken.	Experiments actually carried out.	Explanation, if any, for not following the Programme.
SOUTHERN DIVISION—continued.				
Kolába	Assistant Collector ...	One test each on <i>tur</i> and <i>vál</i> .	One test on <i>tur</i> and one on <i>vál</i> by Mr. Ghosal.	Programme worked out.
	District Deputy Collector.	One test each on <i>rági</i> and <i>vari</i> .	One test each on <i>rági</i> and <i>vari</i> by Mr. Bengiri.	Do. do.
Ratnágiri	Assistant Collector ...	One test each on <i>rági</i> and <i>kodra</i> and two on niger-seed.	One test each on <i>rági</i> and <i>kodra</i> by Mr. Hatch.	Mr. Hatch was engaged in taking rice tests in connection with the revision settlement report he was preparing at the time niger-seed was being harvested.
	Do. ...	Do. do. ...	One test each on <i>rági</i> and <i>kodra</i> and two on niger-seed by Mr. Patwardhan.	Programme followed.
Kánara	District Deputy Collector.	Do. do. ...	One test each on <i>rági</i> and <i>kodra</i> and two on niger-seed by Mr. Kalghatgi.	Do. do.
	Assistant Collector ...	One test each on rice and <i>rági</i> and one on rice, <i>rági</i> , <i>mug</i> or sugarcane.	Two tests on rice and one on sugarcane by Mr. Laird-MacGregor.	<i>Rági</i> is sparingly grown in the charge. During Mr. MacGregor's first visit, the crop was immature and it had all been harvested before his second visit.
	District Deputy Collector.	Do. do. ...	One test each on rice and sugarcane by Mr. Mensinkái.	Mr. Mensinkái was engaged on audit duty while the <i>rági</i> crop was being harvested.

F. B. YOUNG,
Acting Director, Land Records and Agriculture.

ANALYSIS OF CROP EXPERIMENTS. 1899-1900.

CENTRAL DIVISION.

Shola'pur.

Mr. F. B. Young, Superintendent, L. R. and Agriculture, C. D.

Experiment No. 1.—The field is rented to a tenant for one-third the produce or its equivalent in money which comes to (deducting the value of the straw) Rs. 18-11-9 per acre. The assessment is Rs. 1-3-2 per acre, which is paid by the occupant.

Sa'ta'ra.

Mr. C. E. Palmer, Assistant Collector.

Experiment No. 2.—The wheat tested by this officer was mixed with safflower in every ninth row. The experiment was carried out before the issue of G. R. No. 4318 of 7th July 1900, R. D., which prohibited the testing of mixed crops unless experimenters could arrange to test all the crops forming the mixture. This and similar other experiments taken during the year have, therefore, been entered in the tabular summary without as usual making any allowance for the minor crops.

Mr. Palmer's second test was on a mixed crop of *jowári* and barley. It has been rejected because (1) the field was not selected by the experimenter himself, (2) the minor crop of barley was reaped beforehand, (3) the *jowári* was partially unripe and only an allowance by guess-work was made for the unripe plants. The *jowári* is reported to have yielded 1,438 lbs. of grain and 455 bundles of *kadbi* together worth Rs. 91-1-8 per acre; an extraordinary result in a famine year without the aid of irrigation.

Mr. E. G. Turner, Assistant Collector.

Experiments Nos. 3 and 4.—These have been reported in the tabular summary and call for no special remarks.

SOUTHERN DIVISION.

Belgaum.

Mr. F. K. Boyd, Assistant Collector.

Experiments Nos. 5 and 6.—Mr. Boyd forwards two experiments one on gram and another on wheat. In each case the crop was a mixed one. Mr. Boyd reports that he could not find any fields growing these crops by themselves. The safflower seed, which was the subordinate crop in each case, was sown with every eighth row of the principal crop, and the experimenter calculated it to occupy one-tenth of the total area. This is more or less uncertain and as usual the acre out-turn is calculated in this office on the principal crop leaving out of consideration the area occupied by safflower. Mr. Boyd states that "the ears of a 16-anna wheat crop are said to contain 60 grains. The present crop had from 15 to 25. The soil was the rich black soil (*yeri bhum*) which gives Sampgaon its immunity from famine in any year."

Mr. R. C. Artál, Assistant Collector.

Experiment No. 7.—Mr. Artál states that $4\frac{1}{2}$ acres of the field have been rented for a term of 4 years at the annual rent of Rs. 140. This works out a rate of Rs. 31 per acre. A considerable portion of this rent must be debitable to tobacco which is grown on the land. The assessment is Rs. 3 per acre. The field is cultivated jointly by two tenants whose families consist of 4 males and 3 females. They do not own any cattle but hire them when required.

Bija'pur.

Mr. A. K. Cama, Assistant Collector.

Experiments Nos. 8 to 10.—Mr. Cama submits three tests one each on gram, *jowári* and irrigated wheat. The experimenter selected the best crops available for his tests and has thus violated one of the most important standing orders on the subject which requires the selection of "a crop which represents a fair average for the season."

Of the three crops wheat alone had no mixture. The gram had every ninth row of safflower and the *jowári* had every fourth row under linseed. The experimenter finds acre averages after deducting the proportionate areas under minor crops. But as has already been pointed out before this method is far from satisfactory and does not give correct results. The acre averages have therefore been found in this office on the whole area without any deductions for the mixtures.

The outturn of wheat (Exp. No. 10) was $1\frac{1}{2}$ times the maximum (16 annas) of the formulæ or $3\frac{1}{2}$ times the 9 anna crop of the same standard. The price of grain was $17\frac{4}{5}$ lbs. per rupee against about 40 lbs. the normal rate. The experimenter ascertained the price of dry-crop wheat in the market and thence inferred that of irrigated wheat. Why this course was necessary is not apparent. He assumes that the irrigated crop is 3 lbs. cheaper than the dry crop. Why this should be so is not clear. The experimenter puts no value upon the by-product. The straw of wheat is no doubt an inferior fodder, but it has always some value and in a famine year especially it cannot be said to fetch nothing.

Mr. W. T. W. Baker, Assistant Collector.

Experiment No. 11.—Mr. Baker gives two different figures representing the weight of a local *ser* of grain. In his remarks he states it to be between $145\frac{3}{8}$ and $145\frac{1}{2}$ *tolas*, while in the tabular statement he shows it at only 140 *tolas*. If the former represents the weight of the grain on the day of experiment and

the latter of the grain after proper dryage, Mr. Baker ought to have calculated his acre averages on the latter and not on the former. This gives a difference of 24 lbs. per acre.

Dha'rwa'r.

Mr. V. D. Yennemadi, District Deputy Collector.

Experiments Nos. 12 to 18.—Mr. Yennemadi submits four experiments on wheat from the Navalgund taluka and two on the same crop and one on gram from the Ron taluka.

Safflower was the subordinate crop in each case. This failed altogether in the first and fourth fields. In other cases the experimenter tries to apportion the areas under the principal and subordinate crops and bases his acre averages upon the areas under the principal crops thus obtained. This method, however, as already explained is unsatisfactory, and the figures have been corrected in this office.

The experimenter reports that the field in the first test along with another measuring in all 17 acres and 2 gunthas and assessed at Rs. 29 has been leased at an annual rent of Rs. 100. In the case of the sixth field half share system prevails. The tenant supplies labour, seed and cattle and pays the assessment and hands over half the produce to the owner. In the case of all other fields the owners cultivate the fields themselves or by hired labour.

Ka'nara.

Mr. E. G. L. Laird-MacGregor, Assistant Collector.

Experiment No. 19.—The rice field measures about 16 acres and is assessed at Rs. 76. It is Devasthan Inam, and is rented to a tenant at an annual rent of Rs. 100-12. It does not grow a second crop as there are no facilities for irrigation.

P. R. MEHTA,

Acting Deputy Director of Agriculture.

Dated Poona, 23rd October 1901.

Summary of Crop

O. S.—Original Survey ;

No.	District, Taluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formula.	AVERAGE PER ACRE.					
					Seed.	Yield of		Total Value of Produce.	Assessment excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.
						Principal Product.	By-Product.			
1	2	3	4	5	6	7	8	9	10	11
CENTRAL DIVISION.			Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.
SHOLA'PUR.			.	.	.	.	.	.	.	.
Mr. F. B. Young, Superintendent, L. B. and Agriculture, C. D.			.	.	.	.	.	.	.	.
1	Mádha (Mádha) ... SA'TA'RA. Mr. C. E. Palmer, Assistant Collector.	Spelt wheat (Jod), 16th February 1900.	8	630	106	936	2,000 straw, 200 chaff.	66 3 2	1 3 2 R. S.	1·80
2	Válya (Támbeve) ... Mr. E. G. Turner, Assistant Collector.	Wheat, 28th January 1900.	4	100	36	212	305	13 13 0	3 10 11 R. S.	23·69
3	Koregaon (Koregaon) ...	Great millet (Shálu Jowári), 3rd February 1900.	5	210	9	205	1,216	17 14 2	4 4 10 R. S.	24·05
4	Sátara (Kámthi) ...	Wheat (Bakshi), 1st March 1900.	8	350	44	631	593	41 2 0	2 5 1 R. S.	5·63
SOUTHERN DIVISION.			.	.	.	.	.	.	.	.
BELGAUM.			.	.	.	.	.	.	.	.
Mr. F. K. Boyd, Assistant Collector.			.	.	.	.	.	.	.	.
5	Sampgaon (Sampgaon) ...	Gram (Man Kadle), 11th January 1900.	6	140	64	328	245	15 15 9	2 2 2 R. S.	13·36
6	" " ... Mr. R. C. Artál, District Deputy Collector.	Wheat, 11th January 1900.	6	200	62	304	471	16 13 6	2 2 2 R. S.	12·67
7	Chikodi (Nipáni) ... BIJA'PUR. Mr. A. K. Cama, Assistant Collector.	Great millet (Jowári), 23rd November 1899.	6	280	21	643	524 bundles.	43 2 1	2 15 10 R. S.	6·93
8	Hungund (Hirebádvdgi) .	Gram (Kadle), 19th January 1900.	3	45	17	66	...	2 13 3	0 12 8 R. S.	27·99

Experiment Reports, 1899-1900.

R. S.=Revision Survey.

Area of Test.	Equivalent in Tolas of local measure Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
		Principal Product.	By-Product.	
12	13	14	15	16
A. g.	Tolas.	Lbs.	Cwts.	
0 4	145	16 $\frac{1}{4}$	1 $\frac{1}{4}$ straw, 1 $\frac{1}{2}$ chaff.	Experiment No. 1.—Jod or spelt wheat on a black soil field growing both monsoon and late crops, the latter assisted by irrigation. The land lightly dressed with about 5 cartloads of cowdung per acre. Tillage good; but the season unfavourable. No rain after sowing. Seed-rate high. Outturn about 9 annas of the formulæ standard. By-product valued very high at Rs. 10 per acre.
0 9	111	15 $\frac{2}{3}$	9 $\frac{1}{2}$	Experiment No. 2.—Unirrigated and unmanured wheat on black soil growing wheat and jowári and gram in alternate years. Land had been manured in the previous year. Tillage good. Season unfavourable. Safflower was subordinate to wheat and occupied every ninth row. It was not tested. Outturn low. The experimenter states that all crops except those in favoured situations were much below the normal this year.
0 8	111 $\frac{1}{2}$	18 $\frac{1}{2}$	1 $\frac{1}{2}$	Experiment No. 3.—Jowári on a blackish soil field growing jowári and bajri in alternate years. Land manured with about 3 $\frac{1}{2}$ cartloads of cowdung manure per acre. Bajri sown early in the season failed and rabi jowári therefore taken later in the season. The cultivation good; but the late rains deficient and the outturn poor.
0 8	121 $\frac{1}{2}$	15 $\frac{1}{2}$	8 $\frac{1}{2}$	Experiment No. 4.—Bakshi wheat on brownish black soil growing rice in the kharif season every year and a second crop of wheat in favourable years. The land was manured for the early crop with about 20 carts of cowdung per acre. The crop sown after removal of the rice in November. The outturn represents a ten anna crop of the formulæ standard. The incidence on the second crop alone.
0 10	85 $\frac{1}{2}$	20 $\frac{1}{2}$	8 $\frac{1}{4}$	Experiment No. 5.—Gram on a good black soil field growing the same crop alternately with jowári. About 800 sheep were penned on the field for two nights in June. Season unfavourable, there being scarcely any rain after sowing. Tillage careful. Seed-rate very high. Safflower grown subordinate to the gram not tested and the yield in column 7 exclusive of it. Outturn represents a nine-anna crop of the formulæ.
0 10	84	20 $\frac{1}{2}$	2 $\frac{1}{2}$	Experiment No. 6.—Dry-crop wheat on another part of the same field. Here wheat grown in rotation with jowári. The portion under wheat received a dressing of 7 cartloads of farm yard manure per acre a fortnight before sowing. Season, &c., as above. Seed-rate high.
0 12	80	21 $\frac{1}{2}$	40 bun- dles,	Experiment No. 7.—Jowári with tur in every sixth row on reddish gravelly soil growing this crop as well as tobacco, garlic, &c. The field lightly dressed with about 2 $\frac{1}{2}$ carts of farm yard manure per acre. The tillage very careful. The season somewhat unfavourable. The subordinate tur being unripe at date of the experiment not tested. Exclusive of it the yield from jowári alone represents a nine anna formulæ outturn. Prices nearly double the normal rate. Seed-rate very low.
0 9	82 $\frac{1}{4}$	23 $\frac{1}{2}$	...	Experiment No. 8.—Gram with safflower in every ninth row on light brown soil with calcareous kankar underneath. The field manured every fifth year with about 12 carts of cowdung and sweepings per acre. The field was manured this year and prepared for cotton, but the rains being unfavourable for that crop gram was sown instead. Early and late jowári, wheat, gram and cotton taken on the land without any definite rotation. The tillage careful. Season commented well, but the crop suffered from absence of rain after sowing and from adverse winds. Cloudy weather induced insects. The outturn very poor. Subordinate crop not tested.

Summary of Crop
O. S.=Original Survey;

No.	District, Taluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formulae.	AVERAGE PER ACRES.					
					Seed.	Yield of		Total Value of Produce.	Assessment excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.
						Principal Product.	By Product.			
1	2	3	4	5	6	7	8	9	10	11
	BIJA'PUR—continued.		Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.
	Mr. A. K. Cama, Assistant Collector—continued.									
9	Hungund (Hirebádvádgi.)	Great millet (Bile Jola), 8th February 1900.	5	195	3½	134	208 kadbi, 31 chaff.	5 12 4	0 15 0 R. S.	15.79
10	Muddebihal (Muddebihal)	Wheat, 26th February 1900.	9	650	71	2,155	4,210	120 4 4	1 3 6 R. S.	1.02
	Mr. W. T. W. Baker, Assistant Collector.									
11	Bagalkot (Korti)	Great millet (Bile Jola), 8th February 1900.	8	455	4	671	3,015 kadbi, 277 chaff.	26 10 7	1 0 2 R. S.	3.79
	DHA'EWA'R.									
	Mr. V. D. Yenemadi, District Deputy Collector.									
12	Navalgund (Somápur)	Wheat (Kemp Godhi), 7th January 1900.	2	40	22	91	150	5 5 3	1 9 2 R. S.	29.52
13	Ron (Ron)	Do. do. 18th January 1900.	5	150	21	249	160	11 3 1	0 15 10 R. S.	8.84
14	Navalgund (Annigeri)	Do. do. 21st January 1900.	6	200	23	280	240	14 5 9	1 6 9 R. S.	9.90
15	Navalgund (Kamargop)	Do. do. 22nd January 1900.	7	270	24	388	410	19 10 9	1 9 1 R. S.	7.98
16	Do. (Halkusngolli)	Do. do. 23rd January 1900.	10	620	27	648	500	30 4 3	1 13 0 R. S.	5.98
17	Ron (Abbigeri)	Do. do. 26th January 1900.	4	100	19	170	224	8 13 4	0 15 10 R. S.	41.20
18	Ron (Ron)	Gram (Berke Kudle), 26th January 1900.	3	50	15	97	105	4 8 9	0 13 8 R. S.	18.78
	KA'NARA.									
	Mr. E. G. L. Laird-Macgregor, Assistant Collector.									
19	Karwar (Bad)	Rice (Bikakki), 24th October 1899.	8	525	191	1,351 in husk.	2,069	37 1 2	5 3 10 O. S.	14.20

Experiment Reports, 1899-1900:—concluded.

R. S.= Revision Survey.

Area of Test.	Equivalent in Tolas of local measure. Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
		Principal Product.	By Product.	
12	13	14	15	16
A. g.	Tolas.	Lbs.	Cyts.	
0 10 $\frac{2}{3}$	62 $\frac{3}{4}$	27	2 $\frac{2}{7}$	<i>Experiment No. 9.</i> —Jowdri on a black gravelly soil field growing late jowdri, wheat and gram with subordinate mixtures. A sixth of the field manured every year with about 10 carts of cowdung and sweepings per acre. Tillage good; but season very unfavourable and outturn quite poor.
0 4	79 $\frac{7}{8}$	17 $\frac{1}{8}$	...	<i>Experiment No. 10.</i> —Irrigated wheat on dark red soil growing early and late jowdri and chillies, brinjals, garlic, tobacco, wheat, &c., under irrigation. The field said to have been manured with about 66 carts of cowdung and street refuse per acre before the sowing of maize and chillies grown as monsoon crop before wheat was sown. Tillage was careful. Late rains were absent, but the test crop regularly watered twice a week for about 3 $\frac{1}{2}$ months from a well in the field. The outturn in column 7 more than 1 $\frac{1}{2}$ times the maximum of the formulae. By-product not valued though the value of fodder was very high at the time. Price of grain more than double the normal.
0 8	145 $\frac{1}{2}$	33 $\frac{1}{2}$	4 $\frac{2}{7}$	<i>Experiment No. 11.</i> —White jowdri on soft black soil growing early and late jowdri, sesamum and grass with the usual mixtures. The field dressed with about 18 carts of cowdung and ashes per acre before sowing. Tillage good; but the season unfavourable. The field embanked on one side and retained moisture on the low-lying portions; here crop good; elsewhere inferior.
0 8	145	23 $\frac{1}{4}$	1	<i>Experiment No. 12.</i> —Unmanured and unirrigated wheat on rich black soil growing wheat, and late jowdri with the usual mixtures and cotton in rotation. Tillage good. Season unfavourable and outturn poor. Subordinate crops failed.
0 10	154	25 $\frac{2}{3}$	1	<i>Experiment No. 13.</i> —Dry-crop wheat in rows with safflower (8:1) on black soil under similar rotation. The land manured with about 25 carts of cattle manure per acre. Other remarks as above. Outturn 7 annas of the formulae. Subordinate crops not tested.
0 8	151	24 $\frac{1}{2}$	1	<i>Experiment No. 14.</i> —Unmanured and unirrigated wheat on similar soil under like conditions. Other remarks as above.
0 8	146	24 $\frac{1}{2}$	1	<i>Experiment No. 15.</i> —Do. do. do. The field manured in the preceding year for cotton.
0 8	152	25 $\frac{1}{2}$	1	<i>Experiment No. 16.</i> —Unirrigated wheat on similar land which lay fallow during the preceding year. Being close to the village, it was inhabited by the villagers during prevalence of the plague and thus benefited manurially. It was further dressed with about 6 carts of cattle manure per acre. Tillage good and though the season unfavourable, outturn fairly good. Subordinate crop of safflower which occupied every eighth row not tested.
0 10	152	25 $\frac{1}{2}$	1	<i>Experiment No. 17.</i> —Same crop on similar soil not manured for the last three years. Season, &c., as above. The untested safflower occupied every 7th row.
0 8	151 $\frac{3}{4}$	25 $\frac{1}{2}$	1 $\frac{2}{7}$	<i>Experiment No. 18.</i> —Gram on similar soil under like conditions. Outturn poor.
0 4	62	42 $\frac{1}{2}$	3 $\frac{1}{4}$	<i>Experiment No. 19.</i> —Early rice, Bikakki, on sandy dark brown soil growing without irrigation the same crop year after year. The field manured with 50 head-loads of compost of cowdung and dead leaves per acre. Early rains deficient; tillage good. Seed-rate very high; outturn only fair.

ANALYSIS OF CROP EXPERIMENTS, 1900-1901.

NORTHERN DIVISION.

Ahmedabad.

Mr. C. C. Dutt, Assistant Collector.

Experiments Nos. 1 and 2.—These have been entered in the tabular summary and call for no remarks beyond those given there.

Mr. D. N. Nánávati, District Deputy Collector.

Experiment No. 3.—Mr. Nánávati returns the cost of cultivation at Rs. 35 per acre, which is nearly double the value of produce. He explains that owing to the short rainfall the tank had not filled and the field being on a higher situation, the cost of irrigation was considerable. There was also scarcity of labour owing to the prevalence of fever at the beginning of the monsoon.

Mr. Nánávati submits also a test on gram. This field grew wheat last year under irrigation, which is said to have damaged the soil. This year's gram was therefore not irrigated. In Dhandhuka and its neighbourhood, the well water is brackish to salt and irrigation from such wells deteriorates the soil by increasing the salt in it. The gram crop was a failure.

Experiment No. 4.—Reported in the tabular summary.

Kaira.

Mr. C. A. Beyts, Assistant Collector.

Experiments Nos. 5 to 7.—All the three tests taken by Mr. Beyts disclose conditions very different from the average showing high yields even in adverse seasons under exceptional treatment. In the case of Exp. No. 5 the land was recently brought under the plough; the field in the case of Exp. No. 6 was highly manured for tobacco; and gram was the crop grown in the field under Exp. No. 7 on rice land manured and prepared for rice. The incidence in the last case, 27.75 per cent., cannot be considered high, as in an average year gram would be the second crop of the season.

Cawnpore *bājri* (Exp. No. 5) was selected because the seed of the local variety was not available. The crop grew vigorously. The yield of fodder was high but it was inferior in quality. It is not stated whether any subordinate pulses were grown mixed with the major crop. The practice is general in Kaira. Probably they came to nothing owing to the vigorous growth of the principal crop. The experimenter remarks that "the land chosen for the experiment has just come into cultivation and is now at its best. The character of the cultivation is given as indifferent for the reason that the crop was weeded and not much more need have been done for the crop in this land. The adjoining number with exactly the same soil shows the result of a continuation of this style of cultivation without manure, as it was sown at exactly the same time and with the same seed in continuation of the number under experiment. The poverty of the soil was such that the crop was not worth the cutting. No manure seems ever to have been applied for the reason that the owner is not the cultivator. If the cultivator manured the land, the owner would put up the price at once because of the improvement of the soil."

Mr. B. E. Modi, District Deputy Collector,

Submits five tests, two on *kodra*, two on *bājri* and one on wheat. In G. R. No: 4318, dated 7th July 1900, R. D., Government have directed that no experiments on mixed crops should be conducted except where "the officers con-

ducting them are certain of being able to test the outturn of all the crops in the mixture." As four of Mr. Modi's tests (2 on *kodra* and 2 on *bájrí*) are admittedly on mixed crops and he has tested only one crop of the mixture they have not been embodied in the tabular summary. The results are summarised below.

Both the *bájrí* fields had good *gorád* soils assessed respectively at Rs. 6-5-8 and Rs. 6-9-6 per acre. Both the fields grow *bájrí* and *kodra* with the usual pulse mixtures and also occasionally tobacco. The field was manured with 15 to 20 cart-loads of farm yard manure per acre. In the first field *bájrí* was sown mixed with *guvár* and *math*. In the second case *mag*, *chola*, *vál* and *tuver* were added. Rains commenced late and ended very early. *Bájrí* sown with the first fall of rain did not suffer much, but all other crops were more or less damaged. The outturn results were as under:—

	Anna Estimate.	OUT-TURN PER ACRE.		Value of Outturn per Acre.	Incidence of Assessment.
		Principal Product.	By-product.		
		Lbs.	Lbs.	Rs. a. p.	Per cent.
First Field	10	369	1,460	20 8 0	30.99
Second Field	6	183	672	10 2 10	64.78

The subordinate pulses suffered considerably owing to adverse season and are reported to have yielded only a nominal outturn.

The experimenter states that the second field was selected with a view to show the ill-effects of irrigation. In the previous year the crops of *bájrí* and *káng* were raised with the assistance of irrigation and yielded fairly good crops. The water is locally called '*chopdu*' (containing mineral oils) and had the effect of spoiling the land for the current year's crop which accounts for the low yield.

The *kodra* fields were selected in one and the same village. The first field grows *bávto*, *jowár* and *kodra* with the usual pulse mixtures and occasionally tobacco also. In the second field *bájrí*, *jowár* and *kodra* are grown with the pulses. In the first field *kodra* had subordinate to it *tal*, *sheria*, *tuver*, *bávto*, *rátadia* *jowár* and *math*. In the second *tuver* and *tal* formed the mixture. No manure was used in either case, but both fields had received a quantity of manure during the preceding year. The season was characterised by late commencement and early closure of the rains. In the first case the cultivation is described as very good, in the other as rather indifferent. The outturn results are given below:—

	Anna Estimate.	OUT-TURN PER ACRE.		Value of Outturn.	Assessment per Acre.	Incidence of Assessment.
		Principal Product.	By-product.			
		Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.
First Field	10	715	892	20 0 3	7 1 9	35.52
Second Field	6	323	395	9 2 5	5 15 5	65.16

The low yield in the second case is attributed to the imperfect management by the Dharála cultivator, who did not properly till the land and sow it at the proper time.

The experimenter gives estimates of the outturn from the subordinate crops, which may or may not prove to be true.

Experiment No. 8.—Mr. Modi's last test on *Popatia* wheat calls for no remarks.

Broach.

Mr. C. E. Palmer, Assistant Collector.

Experiment No. 9.—Mr. Palmer states that the crop selected for this experiment was a fair average one of the north and east of the Ankleshvar taluka. It appears that the crop was not sufficiently ripe at the time of cutting. It was not fully ripe even after nine days' exposure and some seed still stuck in the ears for which Mr. Palmer made an allowance of 52 sers of grain per acre or one-fifteenth of the produce. An immature crop would weigh much less than a fully matured one, and it would have been more satisfactory if the experiment had been conducted a week later.

The test area was selected from the middle of the field. The borders and headlands were irregular and patchy. A judicious selection of the test area would have been more satisfactory.

Mr. Palmer's second test is omitted from the tabular summary. The wheat "had come up so irregularly all over the field that it was hopeless to try and make up the test area by cutting patches." The season was unfavourable for wheat owing to the absence of late rains. The wheat does not grow well in Dehej (a coast village in Vágra) as in some other villages further east. The outturn amounted to 121 lbs. of grain per acre and was barely three-fold of the seed sown. The straw weighed 600 lbs. and is valued at Rs. 2-13 the acre. The assessment is Rs. 3-5-9 per acre, and the incidence works out to 40-20 per cent

Mr. C. V. Vernon, Assistant Collector.

Experiment No. 10.—This shows the result of careful management by a cultivator of the Pátidar class.

Surat.

Mr. J. A. G. Wales, Assistant Collector.

Experiment No. 11.—The field belongs to a Káchia and is rented by a Rajput, who pays Rs. 60 for the whole number or just double the Government demand.

Experiments Nos. 12 and 13.—The prices at which the principal as well as by-products have been valued are high. The wheat grain is priced at 14½ lbs. per rupee and *vál* at 22½ lbs. Wheat, *bhusa* as well as *vál* fodder is valued at rupee one per cwt. The weight of fodder particularly in the case of *vál* seems excessive, quite five times the weight of pulse. The value of *vál* fodder comes to Rs. 25-9 per acre or nearly equal to that of the pulse. This is however not unoften the case as *vál* fodder is considered very valuable and commands a ready sale. The incidence in each case has been calculated on the value of the second crop alone and need not be considered excessive.

Mr. S. S. Kádri, District Deputy Collector.

Experiment No. 14.—Mr. Kádri values the *kodra paral* at Rs. 3-3 per acre which is not correct as he himself states that it has no value and is burnt in the field.

Experiment No. 15.—Mr. Kádri's statement that the same price (Rs. 85 per *bhár*) prevailed at each of the three pickings is also incorrect. Mr. Wales who conducted a similar experiment in Chorási gives different prices, *viž.* Rs. 85, 80 and 60 respectively. The picking time in the case of both the experiments was about the same. Mr. Kádri had the cotton ginned with the result that the clean cotton amounted to 31-6 per cent.

Experiment No. 16.—Needs no remarks beyond those contained in the tabular summary.

Mr. S. R. Master, District Deputy Collector,

Conducted six experiments, 3 on *kodra* and 3 on castors. In each test Mr. Master has taken only 4 gunthas for the test area for want of time. This is exactly half the prescribed minimum. As however the tests are carefully conducted, they have been retained in the tabular summary.

Experiment Nos. 17 to 19.—The *kodra* crops were raised in *dádri* black-soil fields which grow a crop of *kodra* or castors for 4 or 5 years and then have

to be left fallow for 7 or 8 years. During this period the land is used for grazing. After the period of rest the soil is turned up and a rabi crop of castors taken. Then *kodra* may follow for one or more years. No manure is ever used for this crop. In the case of the third field there were a few plants of *tuver*, but the experimenter states that they were so few and poor that their presence may safely be neglected. The crop in the second field was destroyed in a few places by the parasite *agio* (*Stryga Lutea*). In the 1st and 2nd tests *kodra* was the third crop after the period of rest. In the third case it was the first crop so taken. The incidence is in no case high.

Experiments Nos. 20 to 22.—The three tests on castors were carried out in the Párdi táluka. The soil is described as black in the case of first two and *dádri* in the third field. Crops of *kodra*, *vál* and castors are grown on portions of the fields and portions left fallow every year. Rain was scanty in the latter part of the season and affected the yield. No manure is ever applied.

Tha'na.

Mr. W. C. Shepherd, Assistant Collector.

Experiment No. 23.—Mr. Shepherd forwards an experiment on sugarcane in the Bassein táluka where cultivation of garden crops is extremely good. The test is unsatisfactory. Mr. Shepherd had no time to supervise the operations himself and had to entrust the supervision of reaping and weighing the crop and the preparation of *gul* to the Mámlatdár. This is against standing orders which lays down that no officer below the rank of Deputy Collector is to conduct experiments.

Sugarcane is grown every fourth year. Rice follows cane and then the land is allowed rest for a year. The land was twice burnt over in the previous year. Whole canes were used for seed. The number of canes used per acre is not reported. The sowing was done in April and the crop was top-dressed with castor oil-cake three times in August and September. Well water was used for irrigating the crop but the number of waterings given have not been reported. The tillage was very careful. The crop was said to be somewhat above the average but the experimenter does not believe it. The acre outturn came to 6,474 lbs. of *gul*, 15,703 lbs. of green tops, 10,677 lbs. of dry leaves and 19,367 lbs. of refuse (remains after canes are pressed). The two last are burnt as *ráb* on the field and the green tops are fed to cattle working the mills. The *gul* is priced at $8\frac{1}{4}$ lbs. per rupee, a high rate. The value per acre comes to Rs. 789. The green tops have also been valued high at Rs. 51-8 per acre. An experiment carried out by the same officer in 1898-99 gave an outturn of 9,538 lbs. of *gul* per acre, worth at $14\frac{1}{3}$ lbs. per rupee, Rs. 666-8. Thus while the outturn is 32 per cent. below that of 1898-99 the price is 42 per cent. higher than that prevailing that year and therefore the value of the present crop is higher than that of the previous one. Mr. Shepherd states that "the effect of the short rainfall upon the Bassein garden crops has been greatly exaggerated." It will be, however, seen that, had it not been for the high price of *gul*, the cultivators of sugarcane would have fared badly considering the high cost at which the crop is cultivated. The weight of cane produced per acre and the juice turned out have not been reported. They would have afforded useful comparison with the results previously obtained.

Mr. G. Monteath, Assistant Collector.

Experiment No. 24.—Mr. Monteath submits an experiment on black grām. He had considerable difficulty in finding a field solely under this crop and at last secured one with 7 gunthas under it. Of these he cut 4 gunthas for his test. This area is below the prescribed minimum, but under the circumstances explained the experimenter was unable to avoid it. The land is *mál varkas*. The field is a large one, 20 acres 21 gunthas in extent. Part of it is kept fallow and the grass grown on it is used for *ráb*. The rest of the field is cultivated with ordinary *varkas* crops.

Mr. Bulákhidás Bápuji, District Deputy Collector.

Experiment No. 25.—The high incidence, 44 per cent., is due to its being worked out on a second crop grown in an unfavourable year.

CENTRAL DIVISION.

Kha'ndesh.

Messrs. F. J. Varley and G. D. French, Assistant Collectors.

Experiments Nos. 26 to 30.—These have been reported in the tabular summary and require no special remarks except those given there.

Mr. V. R. Kelkar, District Deputy Collector.

Experiment No. 31.—The field measures 4 acres 12 gunthas and is assessed at Rs. 11. It was purchased by the present occupant 4 years ago from his Sávkár for Rs. 450 or about 41 times the Government demand.

Experiment No. 32.—Mr. Kelkar could not find an unmixed *jowári* crop in his charge and therefore selected the test crop which had only a sprinkling of subordinate crops. These are reported to have yielded almost nothing.

Mr. Shálom Bápuji, District Deputy Collector.

Experiment No. 33.—Reported in the tabular summary.

Mr. F. B. Young, Superintendent, L. R. and Agriculture, C. D.

Experiment No. 34.—The high incidence in this case is due to the poor nature of the crop which appeared good outwardly, but contained many empty pods, a result of adverse season.

Na'sik.

Mr. A. H. A. Simcox, Assistant Collector,

Submits a test on cotton. The report is very meagre and few details have been given. The number of pickings tested have not been reported. The usual rotation has not been given. 51½ lbs. of seed is said to have been used per acre. This is evidently wrong. Probably this quantity was used for the whole area, the extent of which has not been given. The acre yield comes to 250 lbs. of seed cotton valued at Rs. 7-5-10 per acre. The seed cotton has been valued at an extraordinarily cheap rate of 33½ lbs. per rupee. This rate cannot be true. The Mámlatdár of Málegaon reports (in Táluka Form 38) the price for the same article at 6 *ser*s of 80 *tolas* per rupee or 12½ lbs. The test is unsatisfactory and is omitted from the tabular summary.

Mr. W. Plunkett, District Deputy Collector.

Experiment No. 35.—The field belongs to a Márwádi, who bought it 10 years ago for Rs. 225. It is 15 acres 28 gunthas in extent and is assessed at Rs. 13.

Sa'ta'ra.

Mr. A. H. A. Simcox, Assistant Collector.

Experiment No. 36.—The experiment was conducted by Mr. Simcox, who was suddenly transferred. Mr. Agáshe, who succeeded him, reported it, and forwarded 1½ *ser* of nuts as sample, but on weighment in this office it was found to be exactly a *ser*.

Mr. E. G. Turner, Assistant Collector.

Experiment No. 37.—The experiment was performed by Mr. Turner while in charge of the First Assistant Collector's Sub-division and the report has been submitted by Mr. Agáshe, who took charge later in the season. The one and one-fourth *ser* sample forwarded by Mr. Agáshe was found to weigh 143

tolas in this office. This gives 114½ *tolas* per *ser*. The calculations in the report, however, have been based on a *ser* of 84 *tolas*. This is a large difference and is not accounted for. If calculated on the actual weight found in this office the outturn figures should have to be raised by about $\frac{1}{3}$.

Experiment No. 38.—This test as well as the next one is submitted by the experimenter himself. But the reports are very meagre, no remarks whatever having been added to explain the figures recorded or to show whether the rules and standing orders on the subject were properly observed. This assurance is necessary especially in the case of new officers who are likely to lose sight of the standing orders.

The field selected for the groundnut test is 12 acres 5 gunthas in extent. It is partly dry-crop, partly *bágáyat* and partly *tari* (rice land). The assessments for the three kinds have been noted, but not the areas. Thus it is not possible to find the correct rate of assessment for the land growing groundnut. The rate entered by the experimenter is found on the total area and not on the *bágáyat* portion which alone appears to have been under the test crop. The nuts were worth only Rs. 10-11-5 and the haulms which were nearly nine times the weight of nuts, Rs. 10-13-4 per acre. The crop was quite poor (not more than 2 annas) and could hardly have paid expenses even in a year when prices were considerably over the average. The one and one-fourth *ser* sample sent by the experimenter was found in this office to weigh 48 *tolas* only. This gave 38½ *tolas* per *ser* against 43½ *tolas*, on which the experimenter has based his calculations. The difference is perhaps due to dryage.

Experiment No. 39.—The sugarcane test submitted by Mr. Turner is more satisfactory. The outturn came to 2,975 lbs. of *gul* and 8,540 lbs. seed sets together worth Rs. 262-8 per acre. There were besides 9,800 lbs. of tops. But these were apparently fed as usual to the cattle working the mills and their value has been excluded. The outturn is about a third of a good average crop of the Poona district. The following percentages are arrived at from the figures noted by the experimenter :—

					Per cent.
Juice to cane	...	...	...	...	53.1
<i>Gul</i> to juice	...	...	...	...	18.6
<i>Gul</i> to cane	...	...	...	...	9.9

Messrs. E. P. Garret and C. S. Campbell, Assistant Collectors.

A test on *bájrí* conducted by Mr. Garret and submitted by Mr. Turner and another test on the same crop submitted by Mr. Campbell have been rejected as they were on mixed crops. Under G. R. No. 4318, dated 7th July 1900, R. D., tests on mixed crops are prohibited unless the experimenters can find time to test all the crops of the mixture. Mr. Campbell's crop was selected by the Mámlatdár and was not tested till all the *bájrí* had been harvested. The experimenter had not, therefore, the means of knowing whether it represented a fair average crop of the locality. The results are as under :—

	Anna Estimate.	OUT-TURN PER ACRE.		Value of Out-turn.	Assessment per Acre.	Incidence of Assessment.
		Principal Product.	By-product.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.
Mr. Garret's Experiment ...	5 to 6	312	856	14 10 8	2 0 2	13.70
„ Campbell's Experiment...	8	906	436	43 14 3	1 5 4	3.03

Experiment No. 40.—Rice straw, which is poor fodder, has been valued by Mr. Campbell very high at about 160 lbs. per rupee or Rs. 26 per acre.

SOUTHERN DIVISION.

Belgaum.

Mr. R. C. Artál, District Deputy Collector,

Submits three experiments, one on *bájrí* and two on wheat. The crop in each case was a mixed one and should not have been selected for test in face of the orders contained in G. R. No. 4318, dated 7th July 1900, R. D., unless the experimenter intended to test the subordinate crops as well. This has not been done and the experiments are summarised below for what they are worth.

The *bájrí* field had a reddish light friable soil retentive of moisture. It is partly drp-crop and partly garden land. The field was manured with about 25 carts of farm yard manure per acre and 400 sheep were penned upon it for 2 nights. It was sown mixed with *tur* and *kulthi*. The experimenter cut the crop from 10 gunthas and, assuming the area under the subordinate crops at one-fourth of the total, calculates the acre out-turn accordingly. This is more or less arbitrary as the subordinate crops spread out under favourable conditions after the main crop is reaped and cover the whole ground. On the other hand if the conditions are unfavourable the pulses hardly yield anything. Neglecting therefore the out-turn from the subordinate crops altogether and assuming that the test crop occupied the whole area the acre outturn comes to 783 lbs. of grain and 1,118 lbs. straw and 219 lbs. chaff together worth Rs. 40-2-6. Prices were high and the experimenter states that in an ordinary year the crop would not have been worth more than Rs. 20. At the high price for grain and fodder then prevailing the incidence came to 3·76 per cent. With regard to the selection of the crop the experimenter observes that owing to the capricious nature of the late rains the outturn of crops varied considerably in different parts of the same village, and it was difficult to select an ideal average crop. Care however was taken to select a fair average crop of the season.

Mr. Artál conducted a wheat test at Sampgaon and another one at Saundatti with a view to contrast the results as the latter is in the tract affected by famine while the former is out of it. The result, however, is not satisfactory as the season was apparently more or less similar at both the places. The experimenter could not find a field growing wheat alone. He had therefore to select fields with mixed crops. In both cases the wheat was mixed with safflower seed which was sown with every eighth row. Mr. Artál tested 10 gunthas in each field and deducted $1\frac{1}{2}$ gunthas for the area under the subordinate crop before finding the results per acre. For reasons explained above the method is not satisfactory and the following results are shown taking no account of the mixed crop :—

	Anna Estimate.	OUT-TURN PER ACRE.		Value of outturn.	Assessment per Acre.	Incidence of Assessment.
		Principal Product.	By-product.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.
First field	8	317	290	18 4 11	2 5 11	12·94
Second field	6	186	196	10 12 10	0 15 6	8·96

The soil was black in the first case, light in the second. The former was manured with about 10 carts of farm yard manure per acre and by folding 800 sheep for two nights. The latter field received no manure at all. The grain is priced high and the experimenter remarks that the fall in the outturn has been fully compensated for by the dearness of the prices which were double the average.

Dha'rwa'r.*Mr. A. C. Wild, Assistant Collector.*

Experiment No. 41.—Needs no remarks beyond those given in the tabular summary.

Mr. R. S. Baitmangalkar, District Deputy Collector,

Submits two tests, one on *jowári* and another on rice.

The *jowári* was a mixed crop and is not included in the tabular summary. Two rows of *jowári* were followed by a mixed row of *jowári* and *tur* and a mixed row of *jowári* and *mug* alternately. The experimenter apportions the test area as four-fifths under *jowári* and one-fifth under the pulses. As this may or may not be correct, the whole area is assumed to be under *jowári* alone. The acre outturn thus calculated comes to 989 lbs. grain, 2,176 lbs. *kadbi* and 224 lbs. chaff together worth Rs. 36-15-2. The incidence comes to 4·82 per cent.

Experiment No. 42.—Reported in the tabular summary.

Mr. V. N. Sáthaye, District Deputy Collector,

Forwards a test on cotton. The season was very unfavourable and the crop a complete failure. The experimenter should not have taken the trouble to investigate the outturn results from such an abnormal crop. It proves nothing except that the crop had failed in the locality selected by the experimenter.

Kola'ba.*Mr. J. Ghosal, Assistant Collector.*

Experiments Nos. 43 and 44.—Mr. Ghosal forwarded to this office only a few *tolas* of each pulse as samples instead of the contents of an exact *ser* as required by the standing orders.

Mr. R. P. Bengiri, District Deputy Collector.

Experiments Nos. 45 and 46.—These call for no special remarks.

Ratna'giri.*Mr. G. W. Hatch, Assistant Collector,*

Forwards two experiments, one on *nágli* and another on *kodra*. The area selected for test is in each case only 4 gunthas or half the prescribed minimum and the experimenter explains that he could not take more as there was a difficulty in securing rectangular patches of larger extent. The meaning of this is not understood. *Nágli* occupied 1 acre and 30 gunthas and *kodra* 26 gunthas, and from these representative plots of 8 gunthas could have been selected without difficulty.

Both the fields were situated on a level plateau in the same village. The sequence of cropping is also the same in each case. Three crops of *nágli*, *harik* and *vari* were followed by three years of rest. The soil is classed as *málkhandi varkas*. No manure was used in either case. The *nágli* of course was at first sown on rábed seed bed as usual. The tillage was good, but the season only fair owing to deficient rain in October. The *kodra* suffered more than the *nágli*. The outturn results are given below :—

	Anna Estimate.	OUT-TURN PER ACRE.		Value of outturn.	Assessment per Acre.	Incidence of Assessment.
		Principal Product.	By-product.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.
Nágli... ..	8	556	600	13 11 10	0 7 1	3·22
Kodra	6	380	...	5 15 0	0 6 2	6·49

The *nagli* field was the only one standing at the time of test, and Mr. Hatch states that on enquiries made he learned that it represented an average crop of the season. The *kodra* crops were mostly very poor and the test crop was as good as could be found in the locality. The experiments have not been included in the tabular summary.

Mr. D. M. Patwardhan, District Deputy Collector.

Experiments Nos. 47 to 50.—The careful reports submitted by this officer have been embodied in the tabular summary and need no further remarks.

Mr. K. G. Kalghatgi, District Deputy Collector.

Experiment No. 51.—The field (area 2 acres 23 gunthas) is in a Khoti village and belongs to a Mahár who pays one-third produce to the Khot. The Mahár has let it to a tenant who pays about 12 lbs. of niger seed as rent.

Experiment No. 52.—The field (area 3 acres 16 gunthas) is in a Government rayatwári village and is rented for the year for Rs. 1-8. It is not reported whether this sum is inclusive or exclusive of assessment (Re. 0-15).

Experiment No. 53.—Mr. Kalghatgi tested the *nagli* crop growing on the seed bed which had not received the fish manure as well as that growing on the field which had benefited thereby. The test areas, however, were not proportionate to the areas under the two kinds of treatment, and the acre averages drawn by the experimenter are, therefore, inaccurate. He also excludes the outturn got from the *vari* plants sprinkled over the field on the ground that the area under the *nagli* was in no way affected thereby. This is not right. Whatever the land produced ought to be included in calculating the year's out-turn per acre. The figures reported by the experimenter are incorrect, and the figures given in the tabular summary have been changed in this office.

Experiment No. 54.—The field under test is 1 acre 32 gunthas and is assessed at 10 annas. It is rented to a tenant of long standing who used to pay Rs. 4 per annum to the occupant till the year before last and is now paying Rs. 5 or eight times the Government demand.

Ka'nara.

Mr. E. G. L. Laird-MacGregor, Assistant Collector.

Experiment No. 55.—This calls for no special remarks.

Experiment No. 56.—The sugarcane tested by Mr. MacGregor was grown on yellow clayey rice land assessed at Rs. 5-5-2 per acre. The field grows rice continuously for four years and then sugarcane for two years. The test crop was the cane of the second year. The ground was dug a foot deep, levelled and ridged up and burnt with cowdung, dead leaves, grass, &c., towards the end of March. Sets were planted in the furrows two days after the soil was burnt. About 6,000 sets were required per acre. They were planted half foot apart in lines which were two feet distant from each other. Each set contained about 4 or 5 nodes. The land was watered for three days continuously after planting, and then once a week except during the rains. A small brook near the field supplied the water through a channel. Soon after planting, the land was top-dressed with a compost of cowdung, dry-leaves, &c., and the earth raised round the young shoots. The canes were wrapped in September, October and November with their own leaves. This practice is usual in the district and protects the cane from the attacks of wild beasts, &c. The crop took 11 months to mature and yielded 4,175 lbs. of liquid *jagri* and 24,050 seed sets together worth Rs. 319-13-9 per acre. The out-turn seems rather low and is perhaps correctly estimated at 8 annas. The seed sets have been valued high at Rs. 96 per acre, but this is in proportion to the high value of *gul* which prevailed at the time. The per acre results noted by the experimenter are given below:—

Number of canes	...	...	...	...	26,050
Number of seed sets	...	...	...	...	24,050
Weight of cane topped and stripped for the mill	...	...	...	...	36,530 lbs.
Weight of juice	...	...	...	...	23,485 "
Weight of liquid <i>jágrí</i>	...	...	...	...	4,175 "
Percentage of juice to cane	...	...	...	...	64.2
Do. of <i>jágrí</i> to juice	...	...	...	...	17.7
Do. of <i>jágrí</i> to cane	...	...	...	...	11.4

The field is 5 acres 33 gunthas in extent, assessed at Rs. 31, and is rented for Rs. 45 per annum.

Experiment No. 57.—Mr. Laird-MacGregor ascertained the price of clean rice and deduces therefrom the price of paddy, assuming that 12 measures of paddy yield 5 measures of clean rice. This is at least a rough calculation. As the cultivators usually dispose of the produce in the unhusked form, the price of paddy should have been ascertained and noted.

Mr. Laird-MacGregor notes the method of preparing farm-yard manure which is on scientific principles and requires to be imitated in other parts where grass or leaves of trees are available. It is as follows:—Green leaves and twigs are brought from jungles with permission during monsoon and spread in the cowpan. Cattle tread upon them. Every other day the leaves and twigs mixed with cowdung and urine are thrown into a pit, where the manure remains until the land is ploughed.

Mr. Laird-MacGregor says: "In most cases lands are cultivated on partnership or *geni* tenure under a landholder. In the former case (partnership) the tenant gets one-fifth or two-fifths of the produce according to the condition of cultivation (when the tenant gets two-fifths share, he is to supply bullocks, manure and seed), and in the latter case (*geni*) the landholder receives rent in kind (*geni*) varying from 6 to 10 *khandis* of clean rice (*tándul*) per acre according to the fertility of the soil."

Mr. S. V. Mensinkái, District Deputy Collector.

Experiment No. 58.—Mr. Mensinkái states that the field is assessed at Rs. 1-12 and the superior holder receives 63 local *sers* of paddy as rent. This, at the market rate given in the report, is worth only Rs. 2-2. Even supposing that the tenant pays the assessment, the rent is too low and the information supplied to the experimenter is apparently incorrect. A good rice field fetches a much higher rental.

Experiment No. 59.—The sugarcane tested by Mr. Mensinkái was grown on a clayey soil field assessed at Rs. 3-6-10 per acre. Part of the field grows rice and part is under sugarcane. In the current year, out of nearly 6 acres 4½ acres were under cane. After the usual ploughings cattle were tied on the land for nearly a month and then the droppings and withered leaves of cane were burnt on it. The sets intended for planting were then soaked in water for four days and planted in the usual way. They were watered continuously for three days after planting and then three times a week till the approach of the monsoon. In the interval compost of cowdung, ashes and leaves was given as a top-dressing. It was also given later during the monsoon. The cane was wrapped when two feet high and again later on. The watering was again resumed after the close of the monsoon. Two wells in the field supplied the water required. The crop was planted in March and ready for cutting in the second week of January. The growth was somewhat uneven and so two patches of 2 gunthas each were selected for test. The out-turn came to 4,623 as. of *jágrí* worth at the cheap rate of 22 lbs. 16 *tolas* per rupee, Rs. 207-3-10 per acre. The experimenter does not note if any seed sets were kept for planting as usual. If so, they should have been mentioned and valued. He, however, makes mention of fresh tops and values them at about Rs. 70 per acre. But this item has been excluded as these tops are generally fed to

cattle working the mills. The weights of the different products are noted below:—

	Per acre.
Number of canes ...	31,050
Weight of canes stripped and topped ...	lbs. 54,486
Weight of tops ...	7,980
Weight of juice ...	17,043
Weight of <i>jāgri</i> ...	4,623
Average weight of cane ...	2
Percentage of juice to cane ...	31.3
Do. of <i>gul</i> to juice ...	27.1
Do. of <i>gul</i> to cane ...	Nearly 8.5

These figures are unusual. Either there has been a mistake in weighments or the wooden mill, which was apparently used, did not extract the full proportion of the juice.

The field is rented on condition that the tenant pays about 15 lbs. of rice per *gunthā* of cane raised and 100 lbs. for the remainder of the field, or about Rs. 12-8 per acre for sugarcane and Rs. 2 for the rest of the field according to the price of rice reported.

P. R. MEHTA,
Acting Deputy Director of Agriculture.

Dated Poona, 23rd October 1901.

Summary of Crop Experiment Reports,

O. S. = Original Survey ;

No.	District, Taluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formula.	AVERAGE PER ACRE.					
					Seed.	Yield of		Total Value of Produce.	Assessment excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.
						Principal Product.	By-Product.			
1	2	3	4	5	6	7	8	9	10	11
AHMEDABAD.			Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a p.	Rs. a. p.	Per cent.
<i>Mr. C. C. Dutt, Assistant Collector.</i>										
1	Dholka (Dughári) ...	Gram (Chana), 11th February 1901.	4	200	36	144	..	6 5 6	1 6 11 R.S.	22.57
2	Sánand (Rethal) ...	Wheat (Ghar), 4th March 1901.	12	900	76	636	418	39 12 0	1 10 8 R.S.	4.19
<i>Mr. D. N. Nánavati, District Deputy Collector.</i>										
3	Dholka (Kocharia) ...	Rice (Kamod), 7th December 1900.	2	325	20	349 in husk.	923	17 10 0	5 2 7 R.S.	29.28
4	Dhandhuka (Bhadiád) ...	Wheat (Dhola Chá-sia), 4th March 1901.	6	450	51	198	223	10 9 8	1 14 0 R.S.	17.68
KAIRA.										
<i>Mr. O. A. Beyts, Assistant Collector.</i>										
5	Mehmadabad (Kaira) ...	Spiked Millet (Cawnpore Bájri), 20th October 1900.	12	900	14	1,456	4,995 straw 275 chaff.	63 7 6	4 5 10 R.S.	6.87
6	Mátar (Ratanpur) ...	Elusine coracana (Bávto), 30th October 1900.	12	1,650	2	1,492	2,064 straw 225 chaff.	49 7 8	5 5 4 R.S.	10.77
7	Mehmadabad (Páhád) ...	Gram (Chana), 4th February 1901.	8	450	35	625	450	23 7 0	6 8 1 R.S.	27.75
<i>Mr. B. E. Modi, District Deputy Collector.</i>										
8	Thásra (Thásra) ...	Wheat (Popatia), 29th March 1901.	12	1,200	72	1,554	2,726	43 13 9	3 12 11 R.S.	8.68
BROACH.										
<i>Mr. O. E. Palmer, Assistant Collector.</i>										
9	Ankleshwar (Ankleshwar).	Great Millet (Shialu Jowár), 24th February 1901.	8	800	10	800	2,002 or 572 bundles kadbi 268 chaff.	25 0 5	5 1 2 O.S.	20.27

Northern Division, 1900-1901.

R. S.=Revision Survey.

Area of Test.	Equivalent in Tolas of local measure Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
		Principal Product.	By-Product.	
12	13	14	15	16
A. g.	Tolas.	Lbs.	Cwts.	
0 10	40 (weight).	22½	...	Experiment No. 1.—Gram on an unirrigated and unmanured black soil field which remained fallow during the previous (famine) year and grew wheat in the two preceding years. Late rains deficient and the crop further damaged by insects. Cultivation good. Outturn poor.
0 10	Do.	16½	3½	Experiment No. 2.—Dry crop wheat on similar soil under like conditions. The season, however, is reported here to be more satisfactory. Seed-rate rather high. Yield 9 annas according to the formulæ. Prices high.
0 4	Do.	20½	13½	Experiment No. 3.—Rice, <i>kamod</i> , a superior variety requiring a good deal of water on good <i>gordiu</i> soil growing the same crop every year. Last year, however, <i>jowâr</i> was raised under irrigation. Land manured with about 23 carts of ordinary manure per acre before sowing. Cultivation good. The season very unsatisfactory owing to deficient rains and short supply of water in the tank which irrigates the field. The outturn very poor.
0 10	Do.	19½	5½	Experiment No. 4.—Unmanured and unirrigated white <i>châsîa</i> wheat on lowly assessed dry-crop land which grows cotton alternately with wheat or gram. The cultivation good; but the season unfavourable as above. The outturn only 2 annas of the formulæ.
0 8	Do.	25½	9 straw 3½ chaff.	Experiment No. 5.—Cawnpore <i>bâjri</i> on good <i>jirayat jesni</i> land recently brought under tillage. Only one crop had been grown on it before. No manure used. The season only fair, but the crop came out well and vigorously. The outturn of grain though valued at the average standard is more than bumper according to the formulæ. The weight of fodder high; it is, however, reported to be inferior in quality.
0 8	Do.	32½	4½ straw 7½ chaff.	Experiment No. 6.— <i>Bâvto</i> on good <i>besar</i> land which usually grows tobacco without rotation. Last year barley raised under irrigation. In the current season the field was prepared for tobacco, but the rains being late <i>bâvto</i> was sown instead. About 33 cart-loads per acre of farm yard manure used per acre. The season fair. Tillage very good. The seed-rate low. The outturn full average.
0 8	Do.	26½	6½	Experiment No. 7.—Dry-crop gram on good rice land which is manured every third year. No rice grown during the last two seasons. Gram sole crop during the year though the land was manured and prepared for rice as usual. The late rains being deficient the crop suffered to some extent from drought. The outturn 11 annas according to the formulæ standard.
0 8	Do.	36½	19½	Experiment No. 8.— <i>Popatia</i> wheat on <i>besar</i> soil which grows crops of <i>banti</i> , <i>bâvto</i> , <i>bâjri</i> , &c., in the kharif season and <i>chino</i> , <i>sundhia</i> , potatoes, &c., in the rabi with irrigation assistance. The season unfavourable owing to absence of late rains. The test crop irrigated from a well in the field. About 150 sheep were folded for 2 nights before sowing and the field carefully ploughed four times. Tillage careful. Outturn full maximum of the formulæ standard. The incidence in column 11 calculated on the second crop alone.
0 10	Do.	36	200 bundles kadbi. 4½ chaff.	Experiment No. 9.— <i>Shidlu jowâr</i> or black cotton soil growing cotton and <i>jowâr</i> in rotation. No manure used. Tillage careful and season fair. The crop apparently not fully ripe at the time of cutting and some grain remained in the ears after 9 days' drying. About 53 lbs. per acre added to the yield as a set off against this.

Summary of Crop Experiment Reports,

O. S. = Original Survey ;

No.	District, Taluka, Village, and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formula.	AVERAGE PER ACRE.					
					Seed.	Yield of		Total Value of Produce.	Assessment excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.
						Principal Product.	By-Product.			
1	2	3	4	5	6	7	8	9	10	11
	BROACH—continued.		Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.
	<i>Mr. O. V. Vernon, Assistant Collector.</i>									
10	Amod (Bhimpura) ...	Great millet (Shiálu Jowár), 18th February 1901.	8	700	5	1,272	1,846 or 284 bundles.	37 3 0	4 10 6 O. S.	12.52
	SURAT.									
	<i>Mr. J. A. G. Wales, Assistant Collector.</i>									
11	Chorási (Bhatár) ...	Cotton (Deshi Kapás) 16th February 1901 to 1st April 1901.	8	300	8½	135 seed cotton.	...	11 13 8	5 7 6 R. S.	45.13
12	Jalál pore (Kothibari) *	Wheat (Hánsia), 25th March 1901.	6½	525	64	822	1,105	65 10 11	15 8 10 O. S.	23.68
13	Do. (do.) ...	Large fruited Doli chos (Vál), 25th March 1901.	10	562	44	615	2,950	51 9 0	15 11 5 O. S.	30.45
	<i>Mr. S. S. Kádri, District Deputy Collector.</i>									
14	Bárdoli (Kiher) ...	Paspalum scrobiculatum (Kodra), 24th November 1900.	8	1,000	25	470	1,275 bundles.	14 12 0	2 2 11 R. S.	14.79
15	Do. (Madhi) ...	Cotton, 26th February 1901 to 31st March 1901.	14	525	16	378 seed cotton.	...	35 4 6	3 9 0 R. S.	10.10
16	Mándvi (Bori) ...	Wheat (Hánsia), 9th March 1901.	14	1,225	60	869	569	55 14 0	1 11 3 O. S.	3.04
	<i>Mr. S. R. Master, District Deputy Collector.</i>									
17	Balsár (Párdi Párnera) ...	Paspalum scrobiculatum (Kodra), 15th November 1900.	6	637	31	651	...	13 8 6	0 14 3 O. S.	6.58

Northern Division, 1900-1901—continued.

R. S. = Revision Survey.

Area of Test.	Equivalent in Tolas of local measure Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
		Principal Product.	By-Product.	
12	13	14	15	16
A. g.	Tolas.	Lbs.	Cwts.	
0 10	40 (weight).	38½	3½	Experiment No. 10.— <i>Shidlu jowār</i> on good cotton soil which grows (1) cotton, (2) <i>jowār</i> , and (3) <i>tal</i> and <i>tur</i> in rotation. No manure applied. The season fair. Tillage careful. The field ploughed six times before sowing. The outturn about 14 annas of the formulae though estimated at only 8 annas. In the famine year cotton was sown but came to nothing.
0 8	37½ (weight).	11½	...	Experiment No. 11.—Cotton on a black soil field growing <i>jowār</i> and cotton in alternate years. No manure used for the past two years. The season very unfavourable. Late rains deficient and bolls injured by excessive cold and rain in January. Many bolls not opened at all. The outturn in column 7 the result of 3 pickings and represents less than a four-anna crop of the formulae.
0 8	Do. ...	14½	1	Experiment No. 12.— <i>Hánsia</i> wheat on a good black rice land which grows rice every year followed by a second crop of <i>vál</i> , castors, garlic, or wheat. About 34 carts of cattle manure per acre applied to the rice. The rice is said to have failed for want of water in the tank which is at some distance from the field. The test crop watered four times from a well in the field. The yield under-estimated at 6 annas. The grain valued very high. The incidence on the second crop alone.
0 8	Do. ...	23½	1	Experiment No. 13.— <i>Vál</i> as a second crop on rice land. The field is irrigated from an adjoining tank and <i>vál</i> and castors always follow rice. About 46 carts of cattle manure per acre applied in June before the sowing of rice. Season fair; tillage good. The <i>vál</i> fodder priced very high at Rs. 25-9-0 per acre. The incidence calculated on the second crop only.
0 8	37 (weight).	40½	400	Experiment No. 14.— <i>Kodra</i> on black <i>dádrí</i> soil growing <i>jowār</i> with pulses during the past 3 years. No manure ever applied. Tillage indifferent and the season unfavourable for want of late rains. Yield only four annas of the formulae standard.
0 10	Do. ...	10½	...	Experiment No. 15.—Cotton on a good black soil field growing cotton and <i>jowār</i> with pulses in alternate years. No manure used for the last 15 years. Season fair. The crop slightly affected by clouds in January. The outturn over-estimated at 14 annas. The crop picked three times and the outturn in column 7 is the result of the 3 pickings.
0 8	Do.	16½	2	Experiment No. 16.—Wheat, <i>Hánsia</i> , on a black soil field which grew <i>jowār</i> in the preceding year and wheat for 2 years before that. About four carts of goat dung per acre applied to the field. Tillage good, but late rains deficient and the outturn only 10 annas of the formulae. Grain valued very high. The field is low-lying and bunded and provided with a masonry waste weir to conserve moisture for rabi crops.
0 4	37½ (weight).	48	...	Experiment No. 17.— <i>Kodra</i> on <i>dádrí</i> black soil which grows castors and <i>kodra</i> for 4 or 5 years, and then is allowed to lie at rest for 7 or 8 years. No manure ever used. The test crop the third one after the period of fallow. Rain scanty in the latter part of the season; tillage good. The test area below the prescribed minimum in this and the following 5 tests.

Summary of Crop Experiment Reports,

O. S.=Original Survey;

No.	District, Taluka, Village, and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formula.	AVERAGE PER ACRE.					
					Seed.	Yield of		Total Value of Produce.	Assessment excluding Local Funds.	Incidence of Assessment on the value of Gross Produce.
						Principal Product.	By-Product.			
1	2	3	4	5	6	7	8	9	10	11
SURAT—continued.			Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.
<i>Mr. S. R. Master, District Deputy Collector.</i>										
18	Balsár (Párdi Párnera) ...	Paspalum scrobiculatum (Kodra), 16th November 1900.	4	425	31	449	...	9 5 4	1 5 10 O. S.	14.62
19	Do. (Sharodhi) ...	Do. (do.), 20th November 1901.	6	637	31	679	...	14 1 11	1 8 7 O. S.	10.88
20	Párdi (Paria) ...	Castor seed (Divela), 1st March 1901.	6	225	29	169 seed.	...	9 8 3	0 9 9 O. S.	6.40
21	Do. (Motiváda) ...	Do. (do.), 10th March 1901.	12	450	29	273 do.	...	15 12 5	0 15 10 O. S.	6.27
22	Do. (Khadki) ...	Do. (do.), 10th March 1901.	10	375	29	234 do.	...	13 2 2	0 11 9 O. S.	5.59
THANA.										
<i>Mr. W. O. Shepherd, Assistant Collector.</i>										
23	Bassein (Mulgaon) ...	Sugarcane, 25th March 1901.	8 to 10	2,500 to 3,600	...	6,474 gul.	...	789 0 0	9 2 11 R. S.	1.16
<i>Mr. G. Monteath, Assistant Collector.</i>										
24	Bhivandi (Karivli) ...	Black gram (Udid), 2nd November 1900.	14	360	58	432	...	20 6 8	0 9 3 R. S.	2.83
<i>Mr. Bulákhidas Bápui, District Deputy Collector.</i>										
25	Kalyán (Dabisar) ...	Large fruited Dolichos (Vál), 12th April 1901.	10	375	59	302	1,400	15 13 4	6 15 6 R. S.	44.01

Northern Division, 1900-1901—concluded.

R. S. = Revision Survey.

Area of Test.	Equivalent in Tolas of local measure Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
		Principal Product.	By-Product.	
12	13	14	15	16
A. g.	Tolas.	Lbs.	Cwts.	
0 4	37½ (weight).	48	...	Experiment No. 18.—Kodra on ddri black soil which grows castors and kodra for 4 or 5 years, and then is allowed to lie at rest for 7 or 8 years. No manure ever used. The crop destroyed by disease in places; hence outturn low.
0 4	Do.	48	...	Experiment No. 19.—Do. do. do. The test crop the first one after the period of fallow. Season, &c., as above.
0 4	Do.	17¾	...	Experiment No. 20.—Castors on a black soil field which grows, kodra, vdl, and castors on portions of the field, and the rest allowed to lie at rest. No manure used. Season as above. Tillage good.
0 4	Do.	17¼	...	Experiment No. 21.—Do. do. do. Seed-rate high. * The outturn overestimated at the average standard.
0 4	Do.	17¾	...	Experiment No. 22.—Same crop on ddri soil. Other remarks as above.
0 5	28 (weight).	8½	...	Experiment No. 23.—Red sugarcane on sweet agri bagayat land which grows (1) sugarcane, and (2) rice, followed by rest for a year. The field twice burnt over during the preceding (i.e., fallow) year. The crop three times top dressed with castor cake in August and September. The quantity of manure used as well as the number of waterings given not reported; seed-rate also not reported. The yield under-estimated at 8 to 10 aunas. Gul valued very high.
0 4	75	21½	...	Experiment No. 24.—Black gram on mal varkas land, part of which is under grass and part growing ordinary varkas crops. About 8 baskets of cowdung applied to the 7 gunthas under the crop. Season fairly good and tillage good. The yield full maximum of the formula. Seed-rate very high; nearly five times the usual quantity.
0 8	73½	22¾	5	Experiment No. 25.—Vdl as a second crop on good rice land which grows rice every year and vdl only in seasons of favourable late rainfall. Rains somewhat deficient in the current year. Tillage indifferent. Seed-rate very high. Vdl followed rice this year. The incidence in column 11 on the second crop alone.

Summary of Crop Experiment Reports,

R. S. = Revision Survey ;

No.	District, Taluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to formula.	AVERAGE PER ACRE.					
					Seed.	Yield of		Total Value of Produce.	Assessment excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.
						Principal Product.	By-Product.			
1	2	3	4	5	6	7	8	9	10	11
	KHANDESH.		Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.
	<i>Mr. E. J. Varley, Assistant Collector.</i>									
26	Bhusaval (Kandari) ...	Sesamum (white and black Til), 10th November 1900.	8	245	3	413 seed.	...	28 15 3	3 4 5 R. S.	11.32
27	Jalgaon (Jalgaon) ...	Great millet (white Jowari), 26th November 1900.	12	1,120	4	1,344	280 bundles.	45 15 4	3 11 10 R. S.	8.14
	<i>Mr. G. D. French, Assistant Collector.</i>									
28	Sindkheda (Var) ...	Sesamum (Katali Til), 12th November 1900.	6	140	3½	230 seed.	...	15 0 0	2 14 7 R. S.	19.37
29	Do. (Sindkheda) ...	Great millet (Jowari), 3rd December 1900.	8	455	4	510	344 bundles.	17 6 6	2 11 3 R. S.	15.52
30	Shirpur (Thalner) ...	Gram (Pardeshi Harbhara), 25th January 1900.	6 to 8	140 to 245	42	278	282	18 2 0	2 12 9 R. S.	15.43
	<i>Mr. V. R. Kelkar, District Deputy Collector.</i>									
31	Dhulga (Dhulia) ...	Sesamum (white Til), 21st October 1900.	10	435	3	303 seed.	...	21 15 7	2 8 11 R. S.	11.63
32	Do. (Vinchur) ...	Great millet (Kharif Jowari), 14th November 1900.	13	1,080	9	1,455	345 bundles.	65 9 7	1 5 5 R. S.	2.04
	<i>Mr. Shalom Bapuji, District Deputy Collector.</i>									
33	Chalisgaon (Ozar) ...	Do. (Elichpuri Jowari), 23rd November 1900.	8	420	4½	461	380 bundles.	19 11 0	2 6 2 R. S.	12.11

Central Division, 1900-1901.

O. S. = Original Survey.

Area of Test.	Equivalent in Tolas of local measure Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
		Principal Product.	By-Product.	
12	13	14	15	16
A. g.	Tolas.	Lbs.	Cwts.	
0 10	53	14 $\frac{1}{4}$	...	<i>Experiment No. 26.</i> —White and black sesamum or black soil growing cotton with <i>tur</i> alternately with wheat and <i>til</i> . No manure used for the past 4 years. Tillage good. Season fair owing to deficient late rains. Outturn 10 annas of the formulae standard. Sample sent to this office exceeded the recorded weight by 3 <i>tolas</i> .
0 10	72	32 $\frac{1}{4}$	66 $\frac{3}{4}$ bundles.	<i>Experiment No. 27.</i> —White <i>jowári</i> on a light black soil field, growing without manure <i>jowári</i> and <i>bájrí</i> with or without pulse mixtures. Season as above. Seed-rate low. The yield represents a 15-anna crop of the formulae. The weight of the <i>kadbi</i> (7,280 lbs.) very high and must have been taken before proper dryage. The price of fodder extremely low (15 $\frac{1}{4}$ cwts. per rupee). The sample <i>ser</i> 8 <i>tolas</i> short of the recorded weight.
0 8	112	15 $\frac{1}{2}$	...	<i>Experiment No. 28.</i> —Sesamum on an ordinary black soil field, growing cotton, <i>jowári</i> or <i>bájrí</i> , <i>til</i> or <i>tur</i> in rotation. No manure applied, it being usual to manure the field only once in three years. No ploughing done in the current season. Season as above. Outturn 8 annas of the formulae.
0 10	139	38	86 bundles.	<i>Experiment No. 29.</i> —Unirrigated and unmanured <i>jowári</i> on a black soil field growing cotton alternately with <i>jowári</i> and <i>bájrí</i> mixed with pulses and oil-seeds. Other conditions as above. Crop rather above the average though much below the normal. Owing to the abundance of fodder the price of <i>kadbi</i> was low (9 cwts per rupee).
0 8	135	14 $\frac{1}{4}$	4	<i>Experiment No. 30.</i> —Gram on a good black soil field, growing usually <i>jowári</i> , <i>bájrí</i> , and cotton in the kharif season and wheat and gram in the rabi season in years of good late rainfall. This year no kharif crops grown. Gram and wheat occupied different portions of the field which was not manured for the last two years. Season as above. Tillage ordinary. The pulse priced very high. As reported by the Mámálatdár, the price at the táluks town was 18 lbs. per rupee in January.
0 8	120 $\frac{1}{4}$	13 $\frac{3}{4}$	...	<i>Experiment No. 31.</i> —White sesamum on a black soil field locally called <i>mápur</i> and which grew (1) cotton, (2) <i>bájrí</i> and <i>math</i> , (3) sesamum, <i>bájrí</i> and <i>math</i> , and (4) cotton during the previous 4 years. About 11 cart-loads of cowdung and ashes applied per acre before sowing. Tillage good. Season fair.
0 8	141	24 $\frac{3}{4}$	50 bundles.	<i>Experiment No. 32.</i> —Unirrigated <i>jowári</i> on a light black soil field, manured with about 16 carts of cowdung and ashes per acre. Cotton alternates with <i>jowári</i> and <i>bájrí</i> with the usual mixtures. The <i>jowári</i> tested had also a sprinkling of <i>kodra</i> , <i>udid</i> and <i>mug</i> which were harvested before the <i>jowári</i> was ripe. The outturn more than the full maximum of the formulae. <i>Jowári</i> valued at a rate considerably over the normal, but which doubtless prevailed at the date of the experiment. The <i>kadbi</i> valued at 3 $\frac{1}{4}$ cwts. per rupee.
0 8	138 $\frac{1}{4}$	28 $\frac{1}{2}$	125 bundles.	<i>Experiment No. 33.</i> —Elichpuri <i>jowári</i> on light black soil, growing cotton alternately with <i>jowári</i> and <i>bájrí</i> with the usual mixtures. The land manured with 16 carts of ordinary manure per acre two years ago. Tillage indifferent. Season fair owing to deficient late rains. Seed-rate low.

Summary of Crop Experiment Reports,

O. S. = Original Survey;

No.	District, Táluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formula.	AVERAGE PER ACRE.					
					Seed.	Yield of		Total Value of Produce.	Assessment excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.
						Principal Product.	By-Product.			
1	2	3	4	5	6	7	8	9	10	11
KHA'NDESH—continued.			Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.
<i>Mr. F. B. Young, Superintendent, L. R. and Agriculture, C. D.</i>										
34	Sindkheda (Sindkheda) ...	Linseed (Alsi), February 1901.	4	50	7	138 seed.	...	8 14 6	2 12 7 R. S.	31.28
NA'SIK.										
<i>Mr. W. Plunkett, District Deputy Collector.</i>										
35	Niphád (Dhárangaon Khadak).	Great millet (Nirmali Jowári), December 1900.	10	560	22	542	2,496 kadli.	27 5 4	0 13 3 R. S.	3.03
SA'TA'RA.										
<i>Mr. A. H. A. Simcox, Assistant Collector.</i>										
36	Sátára (Godoli) ...	Groundnut (Bhumi-mug), 24th January 1901.	12	3,600	64	2,504 in shell.	3,138	106 2 8	2 15 1 R. S.	2.77
<i>Mr. E. G. Turner, Assistant Collector.</i>										
37	Sátára (Kaner) ...	Spiked millet (Mahán Bájri), 5th November 1900.	12	640	6	309	842	22 14 0	1 15 1 R. S.	8.49
38	Pátan (Kátavdi) ...	Groundnut (Bhumi-mug), 17th January 1901.	6 to 7	800 to 1,000	56	250 in shell.	2,187	21 8 9	2 7 7 R. S.	11.48
39	Karád (Masur) ...	Sugarcane, 17th April 1901.	10	3,720	15,000 sets.	2,975 gul.	8,540 seed sets.	262 8 0	6 9 5 R. S.	2.51
<i>Mr. O. S. Campbell, Assistant Collector.</i>										
40	Vái (Velang) ...	Rice (Ráyabhog), 24th November 1900.	12	2,400	86	2,648 in husk.	4,206	120 13 8	4 2 8 R. S.	3.44

Central Division, 1900-1901—concluded.

R. S. = Revision Survey.

Area of Test.	Equivalent in Tolas of local measure Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
		Principal Product.	By-Product.	
12	13	14	15	16
A. g.	Tolas.	Lbs.	Cwts.	
0 8	120	15½	...	<i>Experiment No. 34.</i> —Linseed on a good deep black soil field, growing <i>bājri</i> , <i>jowāri</i> and cotton during the past two seasons. The land received no manure during the past 6 years. <i>Til</i> sown at the commencement but failed. Linseed therefore sown later in the season. It, however, suffered owing to deficient late rains and the pods were not fully filled with seed. Hence outturn poor.
0 10	110	25⅔	3½	<i>Experiment No. 35.</i> — <i>Nirmali jowāri</i> on reddish black <i>bharad</i> soil, which remained fallow last year and grew <i>jowāri</i> , <i>bājri</i> , wheat and pulses during the preceding two years. No manure applied. Tillage indifferent. Late rains deficient. Seed rate high. <i>Jowāri</i> not grown in the locality. <i>Bājri</i> takes its place. This was the first time <i>jowāri</i> was tried.
0 4	76½ (weight).	27½	1⅞	<i>Experiment No. 36.</i> — <i>Bhumug</i> on good blackish soil, growing <i>jowāri</i> , <i>bājri</i> , <i>shālu</i> , groundnuts, &c., without any definite rotation. The field manured with about 36 cart-loads of cowdung manure per acre. Tillage good; season fair. The crop irrigated 4 times from a well in the field. Outturn average.
0 8	84	16⅔	2	<i>Experiment No. 37.</i> — <i>Bājri</i> , <i>mahān</i> , on brownish black, <i>chunghad</i> soil, growing groundnut and <i>bājri</i> in alternate years. Ten carts of cattle manure applied per acre. Tillage good; season somewhat unfavourable. The outturn over-estimated at 12 annas. The 1½ <i>ser</i> sample received in this office was found to weigh 14½ <i>tolas</i> and thus there is a difference of 30 <i>tolas</i> per <i>ser</i> (?)
0 8	43½	23½	1⅞	<i>Experiment No. 38.</i> —Groundnut on darkish red <i>bhurshi</i> soil, growing without any definite rotation, <i>sāva</i> , <i>nāchni</i> and groundnuts. Ten carts of cattle manure applied per acre before sowing. Tillage good. Rains deficient, but the crop watered 3 times from an adjoining stream. The outturn quite poor and can hardly have paid expenses. The sample <i>ser</i> short of the reported weight by 5 <i>tolas</i> . The assessment per acre wrongly calculated on the whole number and not on the <i>bāgāyat</i> portion only as ought to have been done.
0 4	80 (weight).	14	1¼	<i>Experiment No. 39.</i> —Sugarcane on good black soil, growing rich crops of sugarcane, groundnuts, turmeric and <i>shālu jowāri</i> without definite rotation. The land manured with 30 cart-loads of cattle manure per acre before sowing. The crop watered from a one <i>moṭ</i> well in the field once a week after the rains ceased. Outturn poor, compared with that obtained in Poona and elsewhere.
0 4	84	28	1¾	<i>Experiment No. 40.</i> —Superior rice, <i>rāyabhog</i> on good <i>tari</i> land, growing the same crop year after year followed by second crops of peas, gram, wheat or lentils. The seed-bed was manured with one cart-load of cattledung and 4 loads of dried leaves and the field with 20 cart-loads of cattle manure per acre. Two gunthas of seed-bed sufficed for 1½ acre of field. The outturn 14 annas according to the formula standard. The sample <i>ser</i> 7 <i>tolas</i> short of the reported weight. The by-product valued extraordinarily high at Rs. 26 per acre.

Summary of Crop Experiment Reports,

O. S.=Original Survey;

No.	District, Táluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formula.	AVERAGE PER ACRE.					
					Seed.	Yield of		Total Value of Produce.	Assessment excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.
						Principal Product	By-Product.			
1	2	3	4	5	6	7	8	9	10	11
	DHA'RWAR <i>Mr. A. C. Wild,</i> <i>Assistant Collector.</i>		Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.
41	Kalghatgi (Devikopp) ... <i>Mr. R. S. Baitmangalkar,</i> <i>District Deputy Collector.</i>	Rice (Somsáli), 10th November 1900.	12	1,600	68	1,575 in husk	3,420	48 4 8	4 1 9 R. S.	8.51
42	Karajgi (Devihosur) ... •	Do. (Mullu Bhatta), 15th November 1900.	12	1,200	40	1,831 in husk	2,376	47 2 10	4 8 10 R. S.	9.65
	KOLA'BA. <i>Mr. J. Ghosal,</i> <i>Assistant Collector.</i>									
43	Pen (Shiravli) ...	Large fruited Dolichos (Vál), 25th March 1901.	9	300	39	809	500	29 1 0	6 6 3 R. S.	21.98
44	Do. (Mándve) ... <i>Mr. R. P. Bengiri,</i> <i>District Deputy Collector.</i>	Pigeon Pea (Tur), 12th April 1901.	8	210	23	397	292	18 6 7	3 8 11 R. S.	19.32
45	Roha (Jámbugaon) ...	Elusine coracana (Nágli Garvi), 6th November 1900.	9	1,000	2½	938	625	25 5 10	0 4 2 R. S.	1.02
46	Do. (Durtoli) ... RATNA'GIRI. <i>Mr. D. M. Patwardhan,</i> <i>District Deputy Collector.</i>	Panicum miliari (Vari Garvi), 6th November 1900.	8	350	1	538	...	12 3 11	0 4 10 R. S.	2.46
47	Deogad (Talere) ...	Niger seed (Kála Til), 29th October 1900.	8	175	6½	65 seed.	...	3 1 3	0 7 5 O. S.	15.06
48	Do. (Darum) ...	Do. do. 30th October 1900.	10	310	6½	96 seed.	...	4 3 8	0 3 1 O. S.	4.55
49	Do. (Talere)	Elusine coracana (Nágli Mahán), 30th October 1900.	9	800	6½	372	750	14 11 0	0 3 8 O. S.	1.56

Southern Division, 1900-1901.

R. S.—Revision Survey.

Area of Test.	Equivalent in Tolas of local measure Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
		Principal Product.	By-Product.	
12	13	14	15	16
A. g.	Tolas.	Lbs.	Cwts.	
0 4	1,221 $\frac{1}{4}$	37 $\frac{3}{8}$	4 $\frac{5}{7}$	<i>Experiment No. 41.</i> —Drilled rice, locally called <i>somsali</i> , on reddish hard soil growing the same crop year after year. A third of the field is manured every year in turn with about 20 cart-loads of compost of cowdung and rubbish per acre. The field irrigable from an adjoining tank in which water supply insufficient owing to short rainfall. The test field did not however suffer much owing to its proximity to the tank. Tillage indifferent. The yield full average. The prices were double than those of the ordinary years.
0 5	124	40 $\frac{1}{2}$	10 $\frac{1}{4}$	<i>Experiment No. 42.</i> —Drilled rice, <i>mullu bhatta</i> , on reddish black soil growing the same crop every year and chillies, <i>kulthi</i> , <i>sava</i> , cucumbers, &c., on small plots. The field lightly dressed with 4 cart-loads of farm yard manure per acre. Rains short but the crop did not suffer as it was watered from an adjoining tank in which water supply was ample. Tillage good. Seed-rate low. Outturn full maximum of the formulæ.
0 8	76	31 $\frac{1}{8}$	1 $\frac{3}{7}$	<i>Experiment No. 43.</i> — <i>vai</i> as a second crop on highly assessed good kharif land growing rice every year followed by <i>vai</i> only in years of favourable late rainfall. Cultivation good. Late rains somewhat insufficient. The test crop however no way suffered and gave a full maximum outturn. Seed-rate high. The crop slightly damaged by insects. Incidence in column 11 on the second crop alone.
0 8	72	24	2 $\frac{5}{8}$	<i>Experiment No. 44.</i> — <i>Tur</i> on <i>malkhandi rabi</i> land. Cultivation bad. The same crop grown during the past 3 years. No manure used. Season, &c., as above. Seed-rate high. The outturn about 10 annas of the formulæ standard.
0 8	62	38 $\frac{1}{4}$	8 $\frac{1}{4}$	<i>Experiment No. 45.</i> — <i>Nagli</i> on a blackish sandy soil field growing 2 crops of <i>nagli</i> and <i>vari</i> after two years of rest. 3 $\frac{7}{11}$ gunthas of seed-bed raised as usual furnished seedlings for an acre of plantation. Tillage good. The season only fair owing to deficiency at the close of the monsoon. Seed-rate low. Outturn fair.
0 8	70	44	...	<i>Experiment No. 46.</i> — <i>Vari</i> on reddish even <i>varkas</i> land under similar conditions as above. The crop raised from transplanted seedlings. About 1 $\frac{2}{11}$ gunthas of raised seed-bed furnished seedlings sufficient to plant an acre of field. Seed-rate low.
0 8	31 $\frac{3}{4}$	21 $\frac{1}{8}$	...	<i>Experiment No. 47.</i> —Niger seed on <i>bharad varkas</i> land growing 5 crops (<i>kulthi</i> , <i>harik</i> , <i>barag</i> , niger-seed and <i>sava</i>) after 7 years' rest. No manure applied. Tillage good. Season unfavourable owing to deficient late rains. The outturn low owing to this cause and also to the crop being last but one in the rotation.
0 8	32	21 $\frac{1}{3}$	...	<i>Experiment No. 48.</i> —Do, do, on <i>mál varkas</i> land do. do.
0 8	32 $\frac{1}{4}$	26 $\frac{1}{2}$	10 $\frac{1}{4}$	<i>Experiment No. 49.</i> — <i>Nagli</i> on <i>mál varkas</i> land growing (1) <i>sava</i> , (2) <i>nagli</i> , and (3) <i>sarvat</i> rice after one year's fallow. The land received no manure. The seed-bed manured with cowdung. Tillage good. The season unfavourable owing to deficiency of late rains and affected the outturn.

Summary of Crop Experiment Reports,

O. S. = Original Survey,

No.	District, Táluka; Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formulæ.	AVERAGE PER ACRE.					
					Feed.	Yield of		Total Value of Produce.	Assessment excluding Local Funds.	Incidence of Assessment on the Value of Gross Produce.
						Principal Product.	By-Product.			
1	2	3	4	5	6	7	8	9	10	11
	RATNA'GIRI—concluded <i>Mr. D. M. Patwardhan, District Deputy Collector—concluded.</i>		Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.
50	Rájápur (Kondivle) ...	Paspalum scrobiculatum (Harik), 15th November 1900.	4	80	36	90	...	2 0 0	0 3 6 O. S.	19.94
	<i>Mr. K. G. Kalghatgi, District Deputy Collector.</i>									
51	Ratnágiri (Hatkhambe) ...	Niger seed (Kárala). 18th October 1900.	10	310	73 1/4	121 seed.	...	7 14 2	0 3 10 R. S.	3.03
52	Do. (Mirjole) ...	Do. 30th October 1900.	6	100	63 1/4	67 seed.	...	4 4 9	0 4 5 R. S.	6.42
53	Do. (Hatkhambe) ...	Elusine coracana (Nágli Halvi) and Vari (Panicum miliari).	10	500	9 1/2	1,333 72	1,208	57 6 10	0 3 1 R. S.	0.33
54	Do. (Shirgaon) ...	Paspalum scrobiculatum (Harik), 28th October 1900.	10	500	33	1,093	...	20 0 0	0 5 6 R. S.	1.72
	KANARA. <i>Mr. E. G. L. Laird-MacGregor, Assistant Collector.</i>									
55	Kárwár (Binagi) ...	Rice (Kuri Pandya), 25th October 1900.	12	1,200	129	2,373 in husk	4,000 bundles.	64 9 0	3 12 0 O. S.	5.80
56	Kumta (Alkad) ...	Sugar-cane (Das Kabba), 13th March 1901.	8	2,100	6,000 sets.	4,175 liquid jágri.	24,050 seed tops.	319 13 9	5 7 9 O. S.	1.71
57	Honávar (Dugur) ...	Late Rice (Kempi Bhatta), 12th April 1901.	12	...	129	2,656 in husk	2,240	69 3 6	5 0 0 O. S.	7.22
	<i>Mr. S. V. Mersinkú, District Deputy Collector.</i>									
58	Kárwár (Bád) ...	Rice (Azga), 5th October 1900.	10	930	145	2,213 in husk	3,195	52 5 8	4 1 11 O. S.	7.86
59	Ankola (Harváda) ...	Sugar-cane (Das Kabba), 11th January 1901.	12	4,800	12,000 sets.	4,623 jágri.	...	207 3 10	3 6 10 O. S.	1.65

Southern Division, 1900-1901—concluded.

S. = Revision Survey.

Area of Test.	Equivalent in Tolas of local measure Ser.	PRICES OF PRODUCE PER RUPEE.		REMARKS.
		Principal Product.	By-Product	
12	13	14	15	16
A. g.	Tolas.	Lbs.	Cwts.	
0 8	29 $\frac{1}{4}$	45	...	<i>Experiment No. 50.</i> — <i>Harik</i> , last crop in the rotation, on <i>bharad varkas</i> land growing three crops of (1) <i>nagli</i> , (2) <i>vari</i> , (3) <i>harik</i> after 3 years of rest. The season, &c., as above. The outturn very poor, only three times the reported seed-rate, which however is much higher than the average.
0 8	46	15 $\frac{3}{8}$	...	<i>Experiment No. 51.</i> —Niger seed on upland level <i>varkas</i> land growing (1) <i>nagli</i> , (2) <i>harik</i> , (3) niger-seed, (4) <i>barag</i> , (5) <i>sarwat</i> rice after 5 years of rest. Tillage good. Late rains deficient. The yield over-estimated at 10 annas.
0 8	37 $\frac{1}{4}$	15 $\frac{1}{2}$	...	<i>Experiment No. 52.</i> —Niger seed on similar soil on which (1) <i>vari</i> , (2) <i>harik</i> , and (3) <i>nagli</i> have been grown during the past 3 years. Tillage indifferent, sowings having been made rather untimely. Deficiency of rain at the time the crop was in ears affected the outturn.
0 8	46 $\frac{1}{2}$ 48 $\frac{1}{2}$	26 $\frac{1}{4}$ 29 $\frac{1}{2}$	2 $\frac{4}{7}$	<i>Experiment No. 53.</i> — <i>Nagli</i> with sprinklings of <i>vari</i> taken as a first crop in a four course rotation after fallow for an equal number of years on a comparatively level <i>varkas</i> field. Seven gunthas of seed-bed furnished seedlings for 1 acre and 17 gunthas of field raised with cowdung, tree loppings and grass. The rest of the field manured at 20 maunds of fish manure per acre. The cultivation good; and the season favourable. The outturn from the seed-bed area lower than that from the fish manured field. The yield in column 7 however represents the average for the whole field.
0 8	41	54 $\frac{1}{2}$	...	<i>Experiment No. 54.</i> — <i>Harik</i> , a second crop after the usual period of fallow, on similar land. <i>Nagli</i> grown in the previous year treated with fish manure. Season favourable and cultivation good. Seed-rate high. The outturn 1 $\frac{1}{2}$ times the maximum of the formulæ.
0 4	63	48 $\frac{1}{2}$	1 $\frac{3}{14}$	<i>Experiment No. 55.</i> —Rice, <i>kuri pandya</i> , on clayey good soil growing without irrigation assistance monsoon rice from year to year. The field manured with compost of cowdung, dry leaves, &c., before sowing. Season favourable; tillage good. The outturn full average of the formulæ for planted rice. Rice straw has been valued very high at Rs. 16 per acre. In the case of Experiment No. 57 the same officer values the rice straw in the same taluka at Rs. 5 per acre.
0 4	...	18 $\frac{2}{3}$	250 seed tops.	<i>Experiment No. 56.</i> —A second year ratoon crop. Soil gravelly and rich, growing sugarcane for 2 years and rice for 4 years in succession. About 300 head loads of dry leaves, cowdung and grass were spread over the land. The ground dug and burnt before sowing and 400 loads of compost of manure applied as a top-dressing after the plantation. The crop irrigated from a small brook in the neighbourhood for three days continuously as soon as sets were planted and then once a week except during the monsoon. The sets for seed valued very high at Rs. 96 per acre.
0 4	64	41 $\frac{1}{3}$	4	<i>Experiment No. 57.</i> —Late (<i>vaingan</i>) rice on good clayey soil, growing usually both early and late crops of rice. In the current year early rice failed owing to the flooding of a <i>nala</i> passing through the field. The land manured with 100 head-loads of compost of cowdung, dry leaves and grass and ploughed four times. Crop irrigated from the <i>nala</i> . Cultivation good. Outturn full average. Price of principal product in column 7 calculated from that of clean rice on an assumed proportion between the clean and unclean grain.
0 4	63	48 $\frac{1}{2}$	4 $\frac{2}{7}$	<i>Experiment No. 58.</i> —Early or monsoon rice on a sandy rice land, growing the same crop every year without irrigation assistance. About 50 head-loads of compost of cowdung and grass, &c., spread over the field before sowing. Season favourable, tillage good. The outturn full average of the formulæ for planted rice.
0 4	24	22 $\frac{2}{5}$	...	<i>Experiment No. 59.</i> —Sugarcane on <i>kemannu</i> land growing partly rice and partly sugarcane. Cattle tied on the land for nearly a month and then the droppings mixed with withered leaves burnt. The crop while young twice top-dressed with compost of cowdung, ashes and leaves and watered with well water three times a week except during the monsoon. It was also three times wrapped as usual in the district. Outturn fairly good.



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